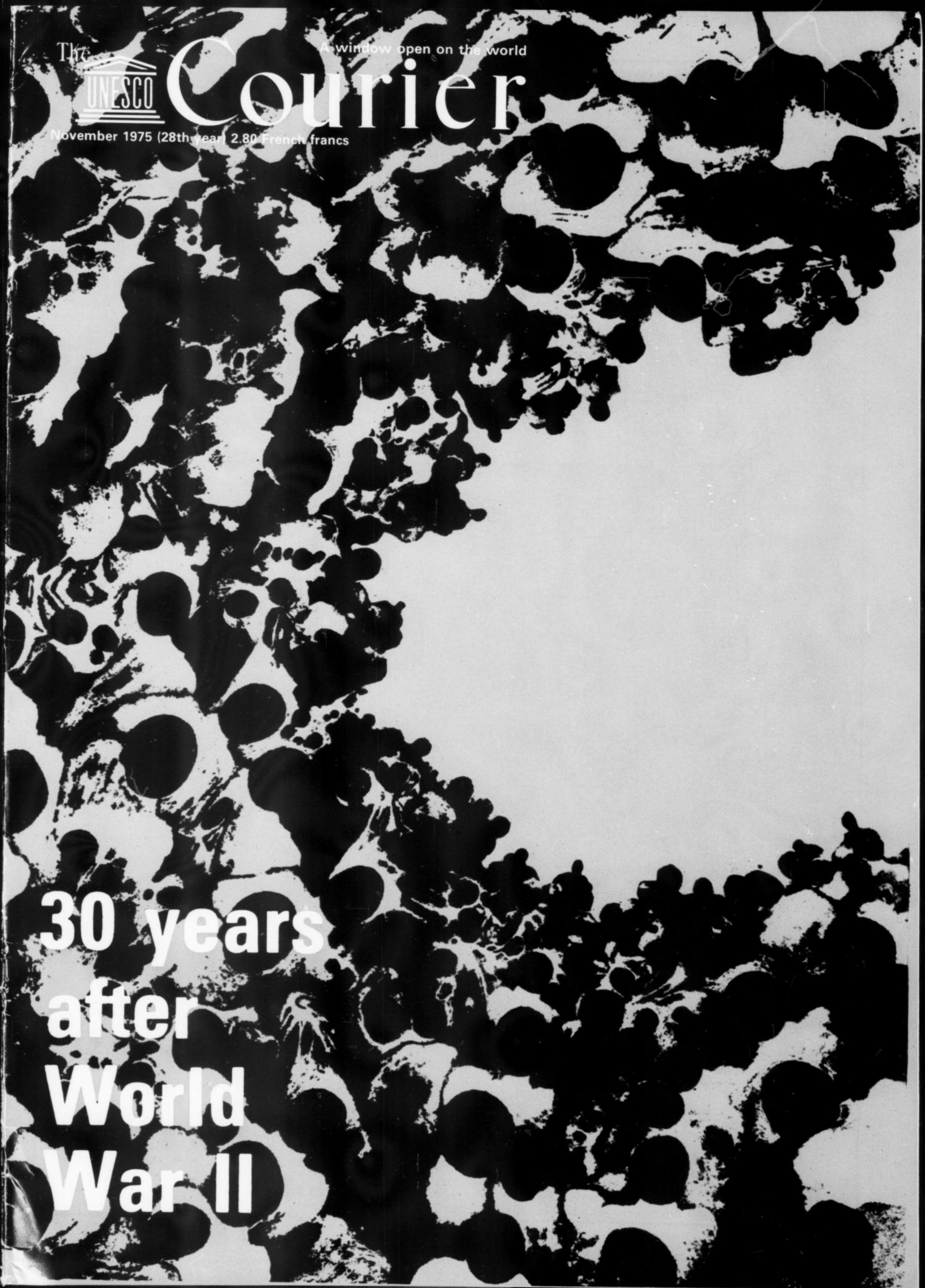
The UNESCO Courier

A window open on the world

November 1975 (28th year) 2.80 French francs



30 years after World War II

Private Collection, New York, U.S.A. Photo © from "Rembrandt. Dessins" by Bob Haak. Editions du Chêne, Paris, 1975

TREASURES OF WORLD ART

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International Women's Year

THE NETHERLANDS

Dutchwoman reading

This work by Rembrandt, "Woman Reading" (a study with pen and brush made about 1638) is one of 1,400 surviving drawings by this illustrious Dutch artist, out of several thousand he is believed to have produced. One of the greatest painters of all times, Rembrandt was born in Leyden in 1606, moved to Amsterdam in 1630 and lived there until his death in 1669. It was in Amsterdam, which this year celebrates the 700th anniversary of its foundation, that he created all his masterworks. In Rembrandt's day, Amsterdam was already a great trading centre and seaport with world-wide links, a cosmopolitan city where the arts and sciences flourished, and a meeting place no less for philosophers and painters than for merchants.

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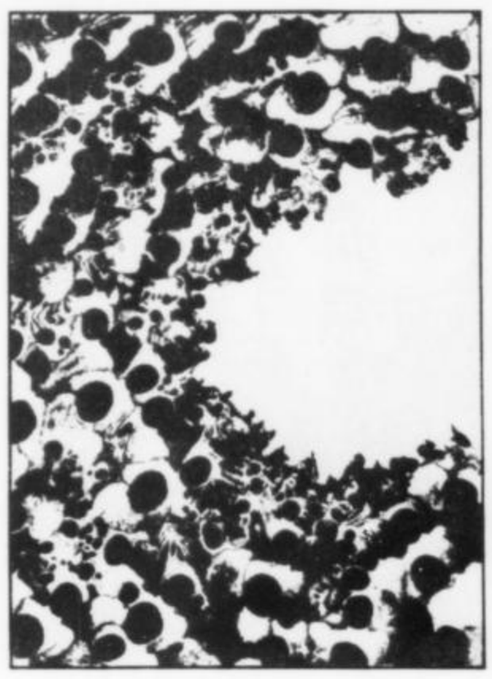


Cover

Cover illustration symbolizes the tragic disruption of our planet during the Second World War, which ended 30 years ago in 1945. This issue of the *Unesco Courier* is devoted to international co-operation, more necessary than ever today, and to the threat posed by the escalation of the nuclear arms race.

Lithograph © Sonia Broniek, Poland

30 years after

Photo © Jackie Raynal, Paris, from the film *Héraclite l'Obscur*, by the French director Patrick Deval

world war II

Thirty years ago, in 1945, the Second World War—the most destructive and murderous conflict in history—came to an end. This event has been solemnly commemorated by Unesco and by many countries throughout the world.
Unesco's Executive Board, meeting in Paris in May, marked the occasion with a special ceremony, and last month (October) Unesco organized an international forum on the subject in Warsaw with the Polish National Commission for Unesco. Other events to mark the occasion at Unesco's Headquarters in Paris included a series of films on the Second World War, as well as various photo and poster exhibitions.
With this issue, the *Unesco Courier* also wishes to mark the 30th anniversary of the end of the Second World War. Our number is divided into three parts as follows: (1) salient passages from declarations by international figures at the special session of Unesco's Executive Board; (2) the creation of the United Nations in 1945, immediately following the end of the war, with a survey of its problems and actions; (3) the threat to the world posed by the proliferation of nuclear weapons.

Amadou Mahtar M'Bow

Director-General of Unesco

THE commemoration of the end of the Second World War rekindles in the hearts and minds of all those who, like myself, were directly involved in that global tragedy, a feeling of indescribable horror at a slaughter of unprecedented cruelty and magnitude.

During the six years that the war lasted, more than 50 million persons—men, women and children from almost every country, civilians as well as non-civilians—died in battle, from bombing raids, in concentration camps, or from other causes directly resulting from the war. And to this tragic loss of human life one must add the devastation of entire areas, the obliteration of cities, and the destruction of works representing centuries of creative effort.

Cruelly destructive and waged at the cost of untold sacrifices, the war ended nevertheless on a note of hope and confidence in mankind, with the victory of those who had fought for freedom against those who sought to impose on the rest of the world by force of arms a tyranny based on injustice, racialism and violence raised to the status of law.

The end of hostilities 30 years ago marked the defeat of a doctrine of evil, and it is understandable that the first concern of leaders facing the immense task of reconstruction was to try by every possible means to prevent such a tragedy from ever happening again.

Out of this determination, and as soon as the war ended, the United Nations system was born, and with it Unesco, in a surge of enthusiasm which is reflected in the entire Unesco Constitution. It is because Unesco was conceived by its founders as one of mankind's bastions against barbarism that the essential mission assigned to the Organization is to contribute to the maintenance of peace—a true peace which can only be assured by the intellectual and moral solidarity of mankind.

The Second World War was brought about by the denial of the democratic principles that imply respect for the individual and by the propagation through ignorance and prejudice of a doctrine of inequality between races and men. When the conflict ended it was clear that Unesco's role should be to help to secure universal respect for justice, for the rule of law, and for human rights and fundamental freedoms for all, without distinction of race, sex, language or religion.

This was the principal concern of Unesco's founders, whose ideas may be considered as the inspiration of all the Organization's efforts, however modest.

But every anniversary is also an occasion for self-examination, and today we should ask ourselves whether those forces which plunged much of the world into chaos 30 years ago have really been neutralized and whether the moral commitments which the international community made to mankind immediately after the war have really been fulfilled. We must ask these questions out of respect for the victims of the Second World War and as a minimum measure of our vigilance.

The last 30 years have seen a constant strengthening of the conscience of the international community. I am thinking particularly of the upward struggle of peoples and the work of the United Nations system, and certain major trends of contemporary history, including the one which led to the emancipation of many countries from colonial domination. All these have paved the way for a more just and more fraternal order on our planet.

But a single glance at the world of 1975 reveals many causes for anxiety. Armed conflicts have not been eradicated (one of the cruellest wars has just ended after devastating a tiny country for 30 years and claiming millions of victims) nor have threats of war; nor the most flagrant violations of human rights (not infrequently ▶

associated with the maintenance or re-emergence of racialism or the resurgence of authoritarianism). Nor have we seen the end of the unjust division of wealth among nations and, in many cases, within nations themselves.

The balance of forces has shifted from the industrialized countries to the poorer countries. This proves that there are no longer any so-called "minor" peoples and that all peoples now aspire to respect for their freedom and dignity. To stifle their aspirations would be to negate the full meaning of the victory won 30 years ago.

But even in the industrialized countries, the arms race, embarked on in the perhaps illusory hope of guaranteeing security through what has been called the "balance of terror", is impeding progress in other fields far more beneficial for mankind and may, if carried to extremes, lead to the very perversion of science diverted for destructive purposes.

The Second World War and the period which preceded it can teach us an important lesson, which is that peace can only be founded on justice and that international co-operation, which is more necessary than ever today, must now enter a new and more dynamic stage. Only in this way can mankind hope to avert the threat of global upheaval such as the one that rent the world apart from 1939 to 1945, and avert the possibility of an even greater catastrophe that would annihilate the whole human race.

This new path of international co-operation to preserve peace is the one that the United Nations and all its agencies have embarked upon with increased vigour, whether it be to promote human rights as they have always tried to do in the past, or to attack the root causes of some of the most serious and dangerous inequalities amongst men through recent action to establish a new international economic and social order.

Unesco must redouble its efforts to serve the cause of peace in all spheres of its competence, and it can do this particularly by helping to construct the defences of peace in the minds of men. As an organization concerned with the world of the human spirit and the human mind and invested with the global authority which its virtual universality has conferred upon it, Unesco can, I am convinced, contribute increasingly to the practical fulfillment of human rights and, if its Member States overcome their differences, it will one day come to be recognized by all mankind as a spiritual forum embodying the conscience of the world.

Hector Wynter
Jamaica
Chairman of Unesco's Executive Board

In 1946, a year after the end of a war that had involved 60 countries and caused the deaths of many millions of people, the governments of 50 states agreed to create Unesco, whose purpose was, in the words of its Constitution, "to contribute to peace and security by promoting collaboration among the nations through education, science and culture in order to further universal respect for justice, for the rule of law and for the human rights and fundamental freedoms which are affirmed for the peoples of the world, without distinction of race, sex, language or religion, by the Charter of the United Nations."

In the 30 years since then, Unesco has been engaged in its task of constructing the defences of peace in the minds of men. Peace is not just the absence of war, but the active interplay of freedom and independence at the individual and national level, with the international co-operation necessary to ensure independence and freedom. It is through international collaboration that the obstacles to active and real peace—poverty, hunger, illiteracy and the denial of human rights—can be overcome.

On this occasion, the Executive Board of Unesco remembers with pride and also with sadness the courage and sacrifice of those who died. The best memorial to them will be through action and co-operation designed to create a world based on justice and equality.

Leonid N. Kutakov
U.S.S.R.

The Second World War swept into its orbit about two billion persons. It was the most bloody and most destructive conflict in history. Millions of lives were wiped out on battlefields, in concentration camps and beneath the debris of bomb-blasted cities.

Every country which fought against the fascists had its toll of dead and suffered grevious losses, but the whole world knows that it was the peoples of the Soviet Union who paid most dearly for the common victory, which cost them twenty million lives. The Soviet Union lost over 30 per cent of its national wealth and 1,710 of its cities and 70,000 of its villages were reduced to ruins...

In recalling the decisive contribution of the Soviet Union to the victory over Hitler, we have no intention whatever of diminishing the contribution and the merits of other peoples and countries. The Soviet people have always deemed and still consider the victory over the fascist bloc as the common victory of the freedom-loving nations which joined the anti-Hitlerian coalition. The military alliance of the Soviet Union with the United States, the United Kingdom, France and other countries with capitalist systems which united their efforts to crush the aggressor was striking proof of the possibility of effective political and military co-operation between states with different social systems.

The Soviet people pay tribute to the resistance movements which, by becoming such a powerful force, played a major role in the occupied countries. The deeds and armed uprisings of resistance groups and the heroism of fighters in the forces of national liberation are inscribed for all time in the annals of the struggle against fascism.

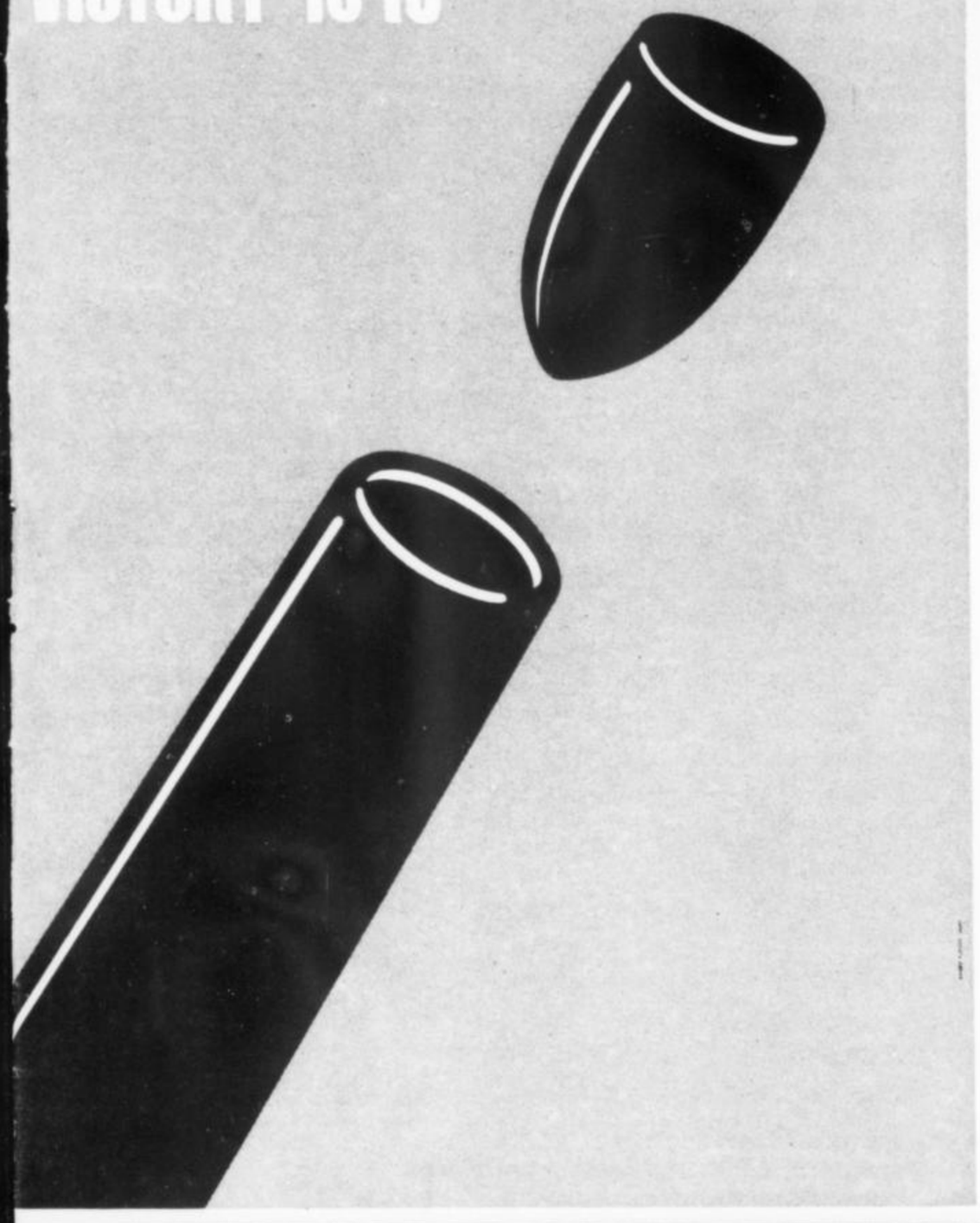
Constantine Warvariv
United States

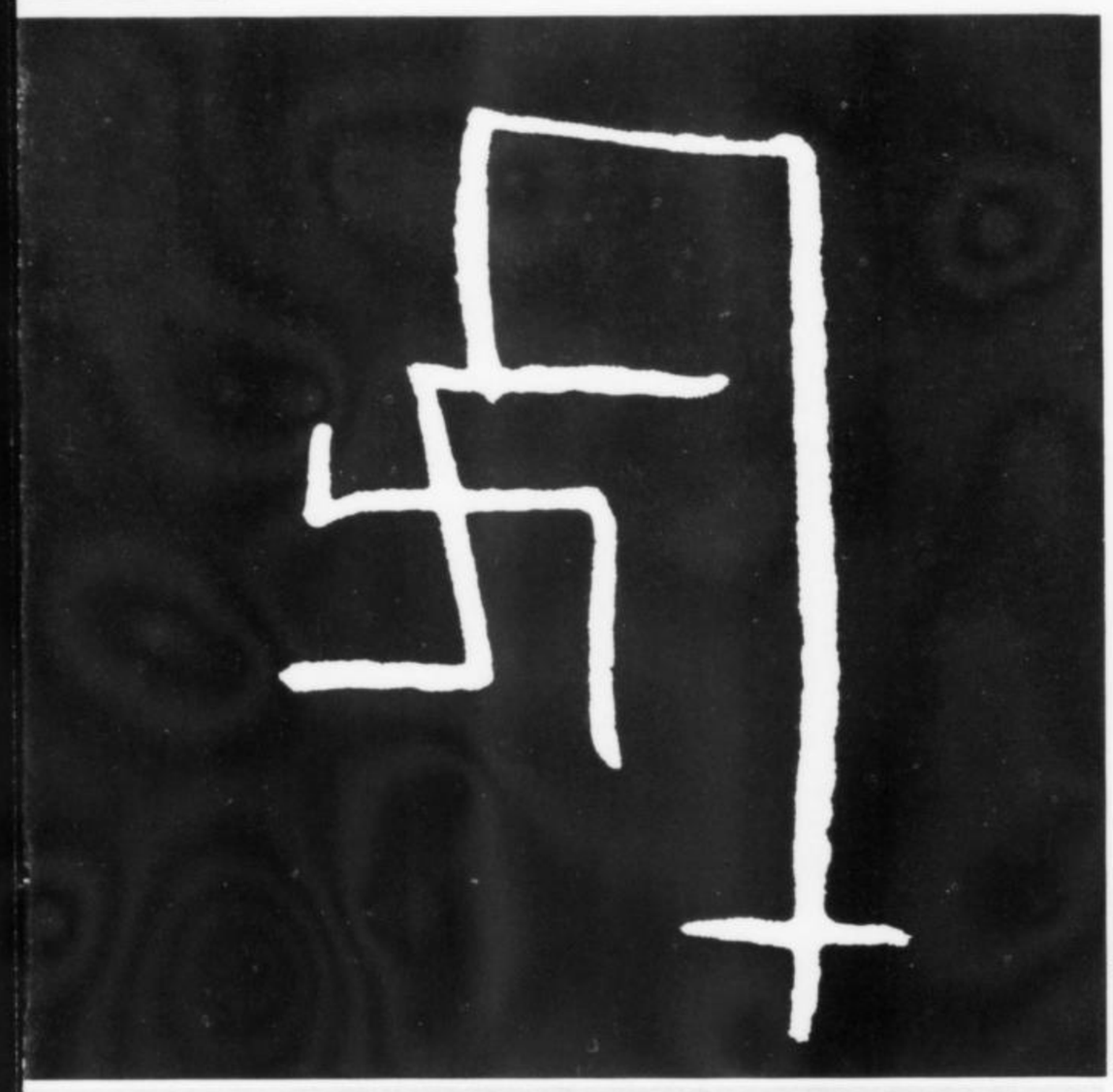
The United Nations arose from the ruins left by the Second World War as a symbol of mankind's determination to work in unison in the search for peace. That historic event deserves to be honoured. The United Nations stands for the principle that differences should not be resolved by violence, but that countries should agree to differ peacefully, since the consequences of a new world war are too catastrophic to contemplate.

Leonard C.J. Martin
United Kingdom

The international community has reached the stage at which recollections of the war must give way to renewed efforts for the broadest possible co-operation within the United Nations. The basic principles of international co-operation were worked out in 1945. Thirty years later it is important that those principles should not separate victors from vanquished, but should increasingly unite all nations.

VICTORY 1945





Photos Unesco

Among the events marking the 30th anniversary of the end of World War II at Unesco's H.Q. in Paris was an exhibition of posters from an international competition which drew 900 entries from 35 countries. The competition was organized by the International Federation of Resistance Movements, the Polish Ministry of Culture and the Union of Polish Plastic Artists. Two first prizes were awarded. Shown here (top) is "Victory" by Shigeo Fukuda (Japan) winner of the first prize and (bottom) a poster by Zbigniew Pieczykolan (Poland) depicting the Nazi swastika hung from a gallows (third prize). The poster awarded joint first prize (not shown here) was by Georgy Kemeny (Hungary).

Madame Sida Marjanovic
Yugoslavia

On 15 May 1945 Yugoslavia regained its freedom. But to achieve this, it was obliged to sacrifice 1,700,000 lives...

Herbert Blankenhorn
Federal Republic of Germany

The suffering and loss of human life, the destruction of cities and irreplaceable cultural values caused by a regime based on megalomania, despotism and violence are still alive in our minds. The people and the Government of the Federal Republic of Germany abhor war and loathe the use of threats and force. They have learnt from the tragedy of war that they must do everything in their power to ensure a peaceful world order based on respect for neighbours, on mutual understanding, tolerance and co-operation...

Lasting peace can best be assured through the co-operation of nations in joint undertakings directed above all towards the solution of global problems. Intensive co-operation is the best means of overcoming conflicts, which are often the result of ignorance, suspicion and fear. The United Nations and Unesco offer the basis on which to practise and to strengthen such co-operation, thereby bringing about solidarity among nations.

Madame Rita Schober
German Democratic Republic

The German people suffered the loss of six million dead. Inestimable cultural treasures belonging to mankind's global heritage were utterly destroyed and at the end of the war most of Europe resembled a vast wilderness of ruins...

All those who wish to carry out the sacred testament of the victims of World War II, who wish to respect the will of those who died and realize the hopes of the living have a duty to preserve future generations from the scourge of war, to strengthen and ensure lasting peace, to see that international détente becomes irreversible, and to resolve all differences between nations by negotiation, using the services of international organizations. These ideals are written into Unesco's Constitution and the same spirit inspires Unesco's participation in the commemoration of the 30th anniversary of the end of World War II.

Kankam Twum-Barima
Ghana

Even now while we talk and plan for peace in the world, a clandestine traffic in arms is still going on to areas where they are likely to cause conflagration. All countries which manufacture, sell or buy weapons are equally guilty.

Nicolaï Todorov
Bulgaria

Unhappily, war still threatens various areas of our planet. Great efforts are needed to ensure that war ceases to be regarded as a means of settling differences. ▶

F. N'Sougan Agblemagnon
Togo

The peoples of the Third World who have only recently regained their freedom, or who are still engaged in winning it, feel anxiety for themselves and for mankind as a whole. Given the present state of the world and the difficulties to be overcome in order to improve existing economic and social structures and to promote a dialogue between peoples of different cultures, the struggle for universal peace and fraternity must be waged still more vigorously, in the spirit of Unesco, on the new battlefields of education, science and culture.

Gopalaswami Parthasarathi
India

This is an occasion for us to reflect deeply on the consequences and lessons of the Second World War which nearly brought about total disaster for mankind. It is a moment for humility and introspection and dedication and for recalling the opening paragraph of Unesco's Constitution: "the great and terrible war which has now ended was a war made possible by the denial of the democratic principles of the dignity, equality and mutual respect of men..." The victory that was achieved at the cost of enormous sacrifices was a triumph over fascism, militarism and the forces of reaction.

Eliezer Yapou
Israel
Acting Permanent Delegate to Unesco

The Jewish survivors of the holocaust have dedicated themselves wholeheartedly to the great ideals of mankind and to their ideal of peace, progress, equality and liberty on the basis of emancipation and independence. Today, exactly as 30 years ago, the entire Jewish people express the hope that racial and other forms of discrimination will be eliminated forever. For it was these discriminations which brought about the horrors of World War II.

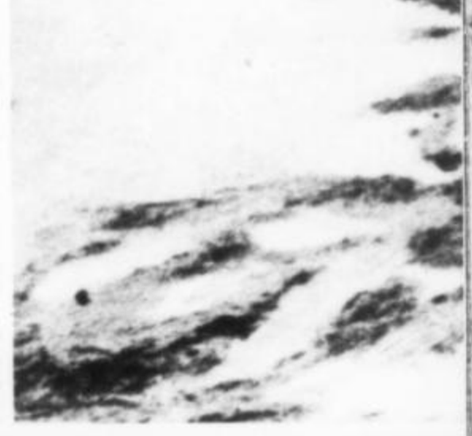
Madame Magda Joboru
Hungary
Chairman of Unesco's General Conference

As a result of the new international balance of power which was born in the wake of the victory over fascism, fundamental changes have taken place in the entire system of international relations. Due to developments, especially those of recent years, the policy of international détente, the practice of peaceful co-existence and mutually advantageous co-operation among states with different social systems have become a dominant trend. All these together make it possible to express the conclusion that now, 30 years after the victory won in the Second World War, the very principles which moved the anti-fascist coalition all through the war and later prevailed over the conferences in Yalta and Potsdam, are being realized one after the other on a higher level and in accordance with the new conditions. A new collaboration of states with different social systems is now in formation, for the purpose of averting a common danger, a new holocaust, and for realizing a common goal—the creation of a new world without wars and armaments.

The Second World War cost the Soviet Union 20 million lives. In this pathetic scene—repeated innumerable times during the Nazi occupation—women search for husband, father or son among the bodies of men executed during reprisals against the civilian population.

In the name of Nazi racism and anti-Semitism, 5,900,000 Jewish men, women and children were murdered, including 4 million exterminated in concentration camps, between 1939 and 1945. Below, a round-up in Warsaw, where 400,000 Jewish people were slaughtered during the war. Below right, the memorial to French victims of deportation, on the Ile de la Cité in Paris, erected in 1962. During the Second World War 238,000 French citizens were deported, more than half of them on racial grounds.

Photo D. Baltermans © APN, Moscow



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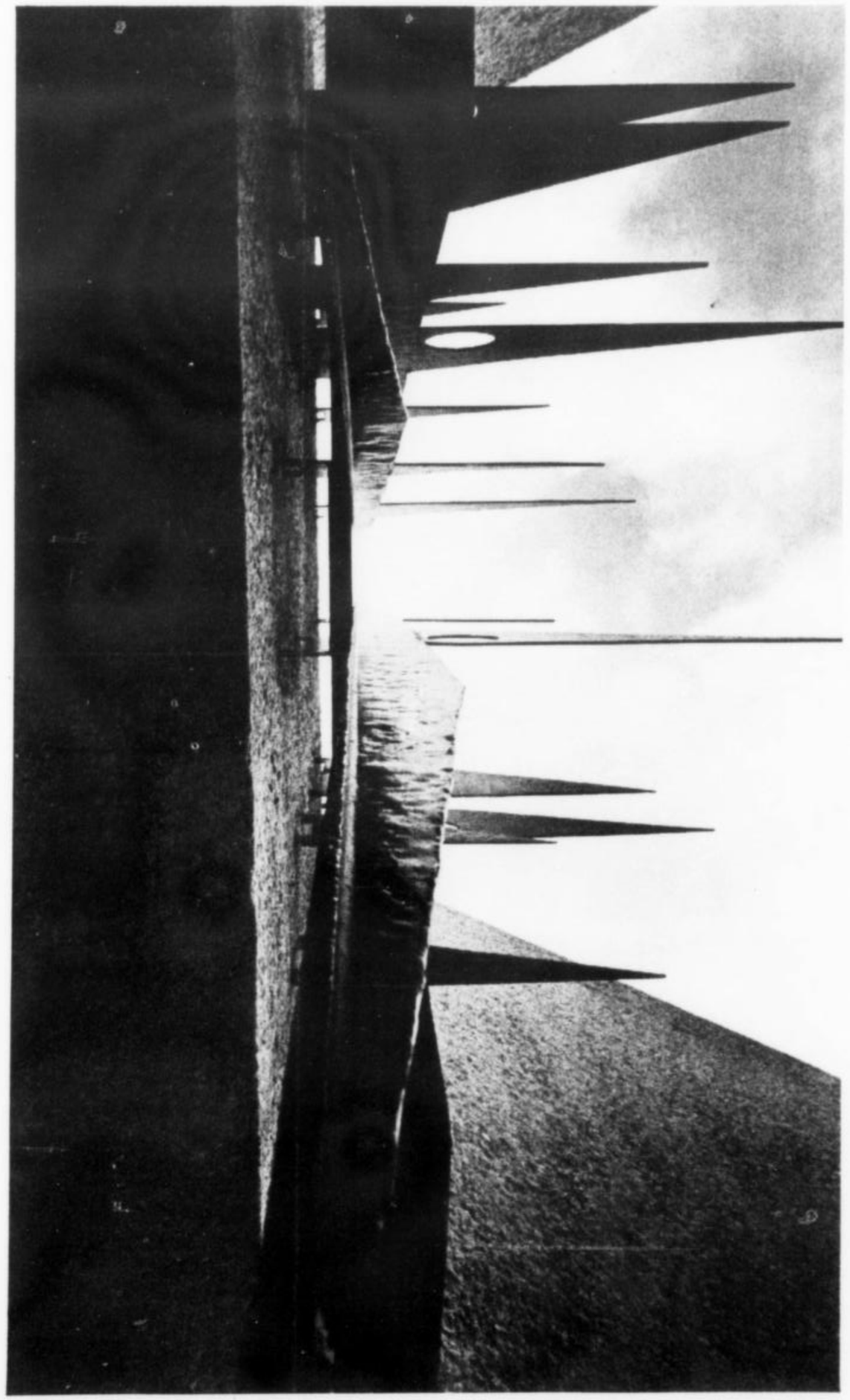

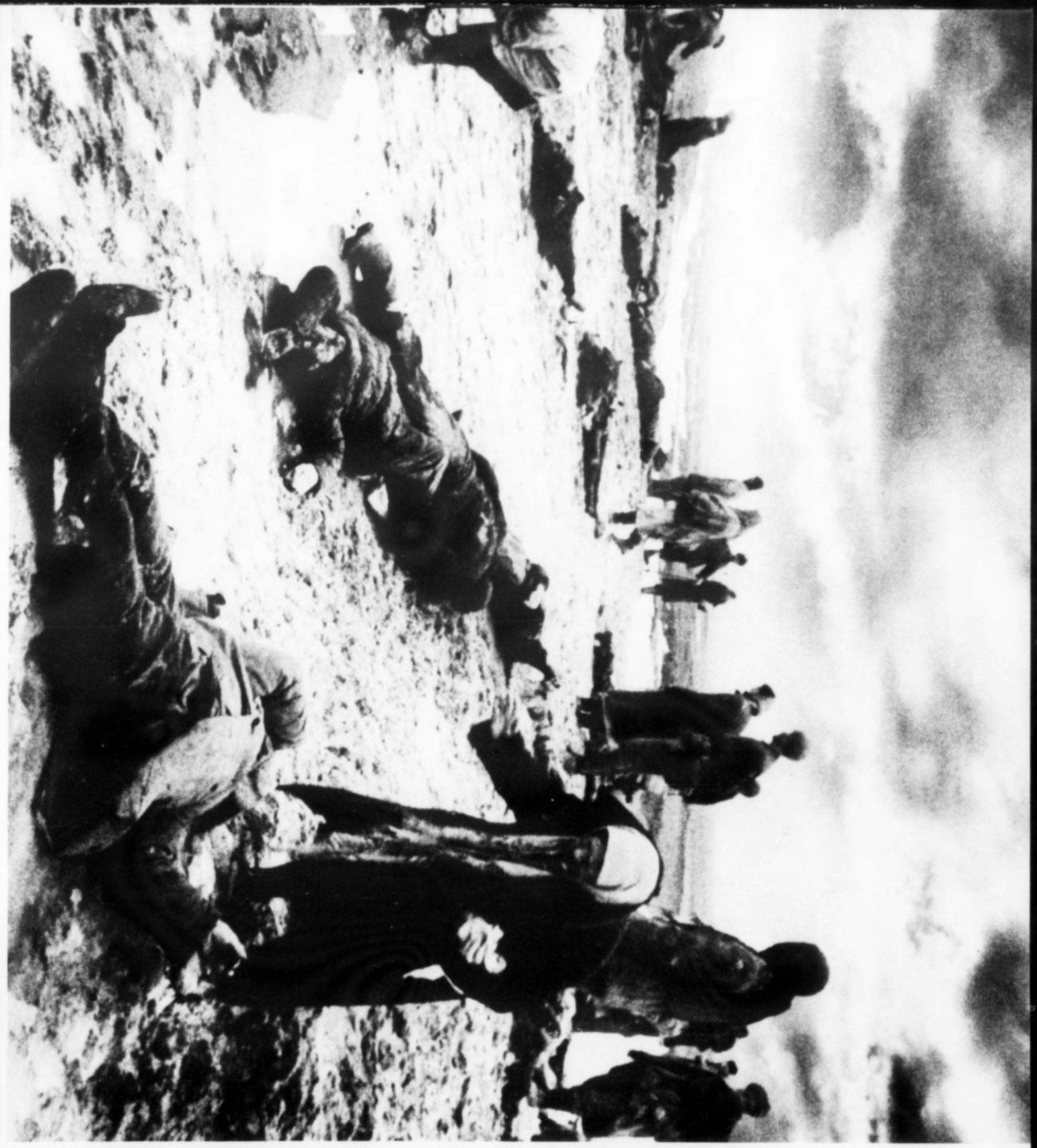

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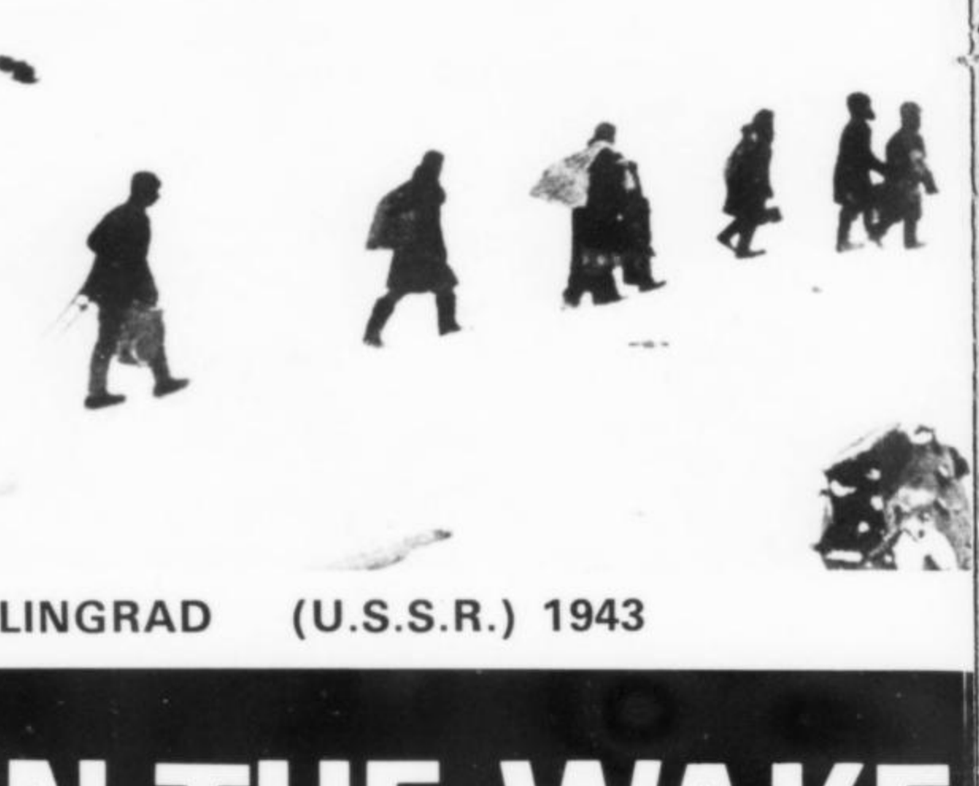
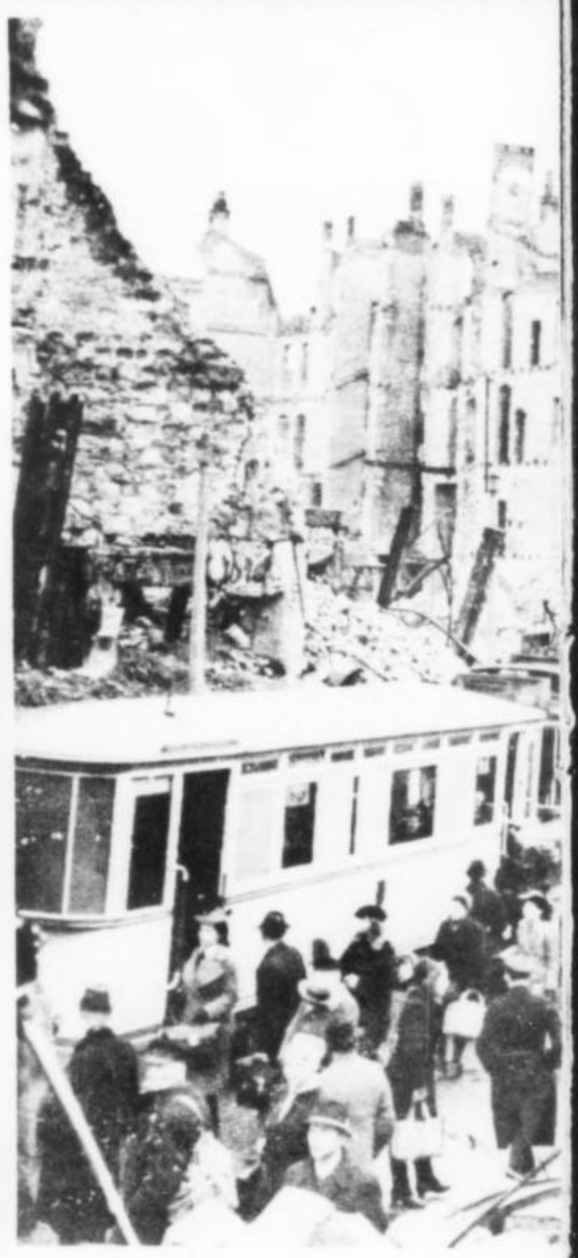
COVENTRY (United Kingdom) 1940



STALINGRAD (U.S.S.R.) 1943

IN THE WAKE



ROTTERDAM (Netherlands) 1940

Photo © Archives Tallandier, Paris

WARSAW (Poland) 1944

OF WAR

DRESDEN (Germany) 1945

Photos © Keystone, Paris

CAEN (France) 1944

Photo Unations

The 39-storey U.N. secretariat building towering more than 150 metres above the East River, New York. Designed by an international team of 10 noted architects, the U.N. complex was completed in 1952.

THE UNITED NATIONS AT AGE 30

The difficult path of international co-operation

by Kurt Herndl

THIRTY years ago, on 24 October 1945, the United Nations came into being. The signature of its Charter in San Francisco on 26 June 1945 marked the end of a war that had engulfed the whole world and brought death to millions of human beings. To the representatives of the 51 states who affixed their signatures to the Charter, the birth of a new international organization not only closed a tragic chapter in mankind's history but also opened a new era which would "save succeeding generations from the scourge of war".

In preparing the Charter of the United Nations, every effort was made to avoid the shortcomings and pitfalls that had been observed in the Covenant of the League of Nations. In place of the rule of unanimity, the parliamentary principle of majority rule was introduced; the role of the Assembly was enlarged; an Economic and Social Council was introduced as a principal organ; special emphasis was placed on the necessity to respect human rights and fundamental freedoms for all human beings without distinction; a trusteeship system was established to advance the independence of the mandated and colonial territories.

However, it was decided to maintain the requirement of unanimity among the five major powers, permanent members of the Security Council, in exercising responsibility for the maintenance of international peace and security.

1945 1955

During the first ten years of its existence, the United Nations created appropriate machinery to deal with the vast array of world political, economic and social problems.

As early as 1946, the Economic and Social Council established the Commission on Human Rights, which in turn started elaborating a body of rules designed to ensure that states respect the human rights and fundamental freedoms of all individuals. In view of the special political powers entrusted to him by the Charter, the Secretary-General began to play an active political role on the world scene.

In the political field, the U.N.'s activities were somewhat hampered by the antagonism which in the meantime had developed between certain major powers. Nevertheless, the U.N. was able to contribute effectively to the restoration of peace in several areas where conflict had broken out. It achieved the first armistice agreements in the Middle East. An armistice was also negotiated in the Korean peninsula. Due not least to United Nations efforts, other dangerous situations—such as those which arose in Indonesia, Greece, Iran and Kashmir—were brought under control and stabilized.

Further, the United Nations embarked immediately on a programme promoting the attainment of independence for people hitherto administered by foreign powers. The Trusteeship Council, which has now become almost obsolete, developed into a powerful organ, which not only supervised the administration of trust territories but also played a direct role, together with the Assembly, in the attainment of independence of those and other non-self-governing territories.

Activities of the U.N. in the field of disarmament did not yield immediate results. However, at the end of the first decade they led to the establishment of the International Atomic Energy Agency.

One of the major achievements of the first decade was the adoption, without a dissenting vote, of the Universal Declaration on Human Rights, on 8 December 1948. This Declaration continues to be universally accepted as a standard in the field of human rights. In order to provide international protection to refugees and seek permanent solutions for their problems, the ▶

KURT HERNDL, *Austrian jurist, is director of the Security Council and Political Committee Division of the United Nations Secretariat. From 1962 to 1965 he was a member of the Legal Department of the Austrian Ministry of Foreign Affairs and was closely associated with the work of the United Nations as a delegate to meetings of the General Assembly and other U.N. bodies. Between 1965 and 1969 he was Deputy Permanent Representative of Austria to the U.N. Office in Geneva.*

General Assembly in 1950 established the Office of the United Nations High Commissioner for Refugees (UNHCR).

The United Nations, from its earliest days, focussed its attention on economic questions. It set up regional economic commissions. In the summer of 1949, the U.N. Economic and Social Council worked out the first comprehensive plan for an "expanded programme of technical assistance". Up to 1955, technical assistance had been given to more than 100 countries and territories under that programme.

1955 1965

During the second decade of its existence, the most dramatic change was the rapid increase in membership, as an immediate result of the process of decolonization. While the U.N. started out with 51 founding members, it had 77 at the end of 1955 and 118 by the end of 1965. Most of the new members admitted in the 1960s were former colonial or trust territories, mainly African.

In fact, United Nations efforts were instrumental in bringing about the independence of millions of people. To this day, the famous Declaration on the Granting of Independence to Colonial Countries and Peoples, adopted by the General Assembly in 1960, is commonly regarded as "the Magna Carta" of dependent countries.

The influx of new members had a far-reaching impact on the Organization. The power relationships which had existed within the U.N. up to that time began to change.

The emergence of new nations led not only to greater attention being paid by the U.N. to those political issues which were of greatest concern to the new members—that is, African problems, and in particular the situation in southern Africa—but also to increased emphasis on the problems of development, which were of vital interest to the new states.

Accordingly, this period saw the establishment of the United Nations Conference on Trade and Development (UNCTAD), which was designed to promote international trade in order to accelerate economic development, particularly trade between countries at different stages of development.

In 1961, the General Assembly launched the First Development Decade. Its chief goals were the attainment of a five per cent increase in the growth rate of the Gross National Product of developing countries and a gradual increase in the flow of aid from the developed to developing countries.

The establishment of UNCTAD and the launching of the First Development Decade are illustrative of a shift in priority which was later to become even more marked. Realizing the interdependence of the modern world, the United Nations began to place more and more emphasis on economic development and related matters.

In the political field also, several very significant developments occurred during the middle years. In 1956, for the first time, the General Assembly established a United Nations Emergency Force in the Middle East, designed to separate the armed forces of Egypt and Israel. This represented a significant step forward as the United Nations had hitherto resorted to a purely supervisory machinery for observing compliance with truces (such as the military observers in Greece, Indonesia, Kashmir and Palestine). The way was thus paved for the establishment of similar operations of a quasi-military nature in other areas of the globe.

When the Congo crisis erupted in 1960, the United Nations again mounted a large-scale peace-keeping operation and dispatched United Nations troops to the area. At the height of the Congo operation some 20,000 troops from more than a dozen Member States were deployed in the Congo. In the course of this operation the United Nations suffered the loss of its second Secretary-General, Dag Hammarskjöld, who perished while engaged in the search for peace in the area.

Once again, in 1964, the United Nations dispatched peace-keeping forces—this time to Cyprus to preserve international peace and prevent a recurrence of fighting between the two communities of that island. The Organization also achieved a cease-fire in the armed conflict which broke out between India and Pakistan in September 1965. These examples demonstrated that the Organization was able to cope with direct threats to international peace and security in a dramatic way, although, admittedly, not all such situations were brought before the United Nations.

The U.N. meanwhile continued its efforts in the field of human rights, adopting two international covenants on human rights—one on economic, social and cultural rights, the other on civil and political rights—together with a number of measures to combat racism and racial discrimination.

The United Nations also ventured into a hitherto unknown field: that of outer space. Once it became clear that major powers were about to launch important space programmes, the U.N. immediately set up machinery to follow the scientific developments and ensure that future scientific, technological and informational benefits would accrue not only to space powers but to all states. The U.N. also elaborated a legal framework under which outer space activities would thenceforth be carried out for the benefit of all mankind.

Important principles which would govern the activities of states in space were laid down in the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, adopted by the General Assembly in 1963. This declaration later became, with minor changes, what is commonly referred to as "the Outer Space Treaty".

During this time United Nations efforts in the field of disarmament continued, the main objective at this stage being the prevention of the spread of nuclear weapons. One step on that path was the conclusion of the 1963 Test Ban Treaty (although that Treaty was not concluded under United Nations auspices).

1965 1975

During the third decade of its existence the United Nations was confronted with a series of new challenges which arose from the rapidly changing world situation. In the political field the effects of détente were being increasingly felt, so that the issues brought before the United Nations were more and more of an economic and related nature.

In view of the growing awareness of mankind of the innumerable problems created by overpopulation, insufficient food supplies, pollution, over-urbanization and increasing crime rates, the United Nations became a forum for discussion of these questions and for efforts to take collective corrective action.

It is generally recognized that the U.N. achieved a high measure of success with the world-wide conferences which it organized from 1972 onwards on these problems. The United Nations Conference on the Problems of the Human Environment (1972) approved a Declaration of principles on the responsibilities of states with regard to the environment which led to the establishment of the United Nations Environment Programme (UNEP). The World Popu-

lation Conference (1974) adopted the World Population Plan of Action. The World Food Conference (1974), preoccupied with a shrinking world food supply, set up the World Food Council. In 1976, the United Nations will hold a Conference-Exposition on Human Settlements (Habitat) in order to tackle the problems of urbanization.

The United Nations Development Programme (UNDP) set up in 1965, has over the years carried out numerous large-scale investment projects to aid the development of many countries. UNDP's annual budget is now normally larger than that of the United Nations itself.

In 1966, the General Assembly established the United Nations Industrial Development Organization (UNIDO), to promote the industrialization of developing countries. In 1970, the Second Development Decade was proclaimed and in the spring of 1974 the sixth special session of the General Assembly adopted the Declaration and Programme of Action on the Establishment of a New International Economic Order.

Realizing the interrelationship of the problems of trade, development, development finance and international monetary transactions, the General Assembly drafted the Charter of Economic Rights and Duties of States, which it solemnly proclaimed on 12 December 1974. This Charter is of particular importance and will have a considerable impact on the future economic relations of states.

It is obvious that the transformation of the world's economic relations into a system based exclusively on economic co-operation and precluding any economic domination will require adjustment and accommodation—even sacrifice—by all states. In any event, to the credit of the United Nations it has been able to set in motion a process of reappraisal in all circles.

The measures taken by the General Assembly in this field were complemented by action taken by UNIDO, particularly by the Declaration on Industrial Development and Co-operation, adopted in March 1975, and a Plan of Action, which urged that the share in total world production of the developing countries—which have 70 per cent of the world's population—be increased from its present 7 per cent to 25 per cent by the end of this century.

Besides these new activities, the United Nations has not neglected other political areas during the last decade. It has continued its work in the field of outer space and has elaborated several important conventions, such as the Outer Space Treaty (already mentioned) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects, and the Convention on Registration of Objects Launched into Outer Space.

Of particular interest is the work of the U.N. in the field of communications by direct broadcast from satellites. In 1968 a world-wide Conference on Outer Space Questions was held, at which the practical benefits to be derived by non-space powers, particularly the developing countries, from space research and exploration were examined.

Concern for problems of the peaceful uses of the sea-bed and the ocean floor led to the adoption of a Declaration of Principles on this question in 1970. United Nations efforts in this field proved the need for a general overhauling of the law of the sea, and to that end the General Assembly convened the Third Conference on the Law of the Sea, which has met in New York (1973), Caracas (1974) and Geneva (1975), and which is expected to conclude its work in 1976.

In the field of disarmament, the U.N. has been instrumental in the drafting and adoption in 1968 of the Treaty on the Non-Proliferation of Nuclear Weapons.

Additional conventions adopted concern the prohibition of the emplacement of nuclear weapons and other weapons of mass destruction on the sea-bed and the ocean floor and its subsoil, and the prohibition of developing, producing and stockpiling bacteriological (biological) weapons.

Admittedly, the United Nations during its third decade failed to prevent renewed armed conflict in the Middle East, in the India-Pakistan subcontinent, and in Cyprus. In all three cases, however, the U.N. became deeply involved in the direct aftermath of the conflict. In the Middle East a new peace-keeping operation was launched which succeeded in maintaining calm in the area. In Bangladesh, the United Nations undertook an immense relief operation. In Cyprus, the U.N. presence was an important factor in containing the scope of the conflict.

The problems of southern Africa are still with the U.N. So far, United Nations efforts to bring about the necessary changes in that part of the world, including the application of economic sanctions to Southern Rhodesia, have not been crowned with success although almost all the former Portuguese territories in Africa have at last attained independence. One can say, however, that the prospects for change in that area have improved, due not least to the endeavours of the United Nations.

The status of women, for which a specific subsidiary body was created as early as 1946, has received increasing attention. As part of "International Women's Year" a World Conference was held this year, at which a World Plan of Action was adopted.

At the end of the third decade, United Nations' activities are universal in the proper sense of the word. The Organization itself with 138 Member States has achieved near-universality in its membership, especially since the question of the representation of China was settled in 1971 with the admission of the People's Republic of China into the U.N.

Perspectives for the future

What then are the overall achievements of the United Nations during the past three decades and what are the perspectives for the future? Clearly, the United Nations has not met all the hopes which the peoples of the world had placed in it, but neither has it failed them all.

In respect of the main political goal for which the U.N. was established—the maintenance of peace in the world—the Organization has been more or less successful. It cannot be denied that the United Nations has contributed actively and effectively to the prevention of a new world-wide conflagration. It has also succeeded in preventing a number of local conflicts and in limiting the spread of others, thus avoiding their turning into wider confrontations.

By its mere existence the United Nations has a persistent effect on the relations between states, lessening tensions and helping to discourage the tendencies to resort to violent action. To that end, the United Nations has

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THE NUCLEAR

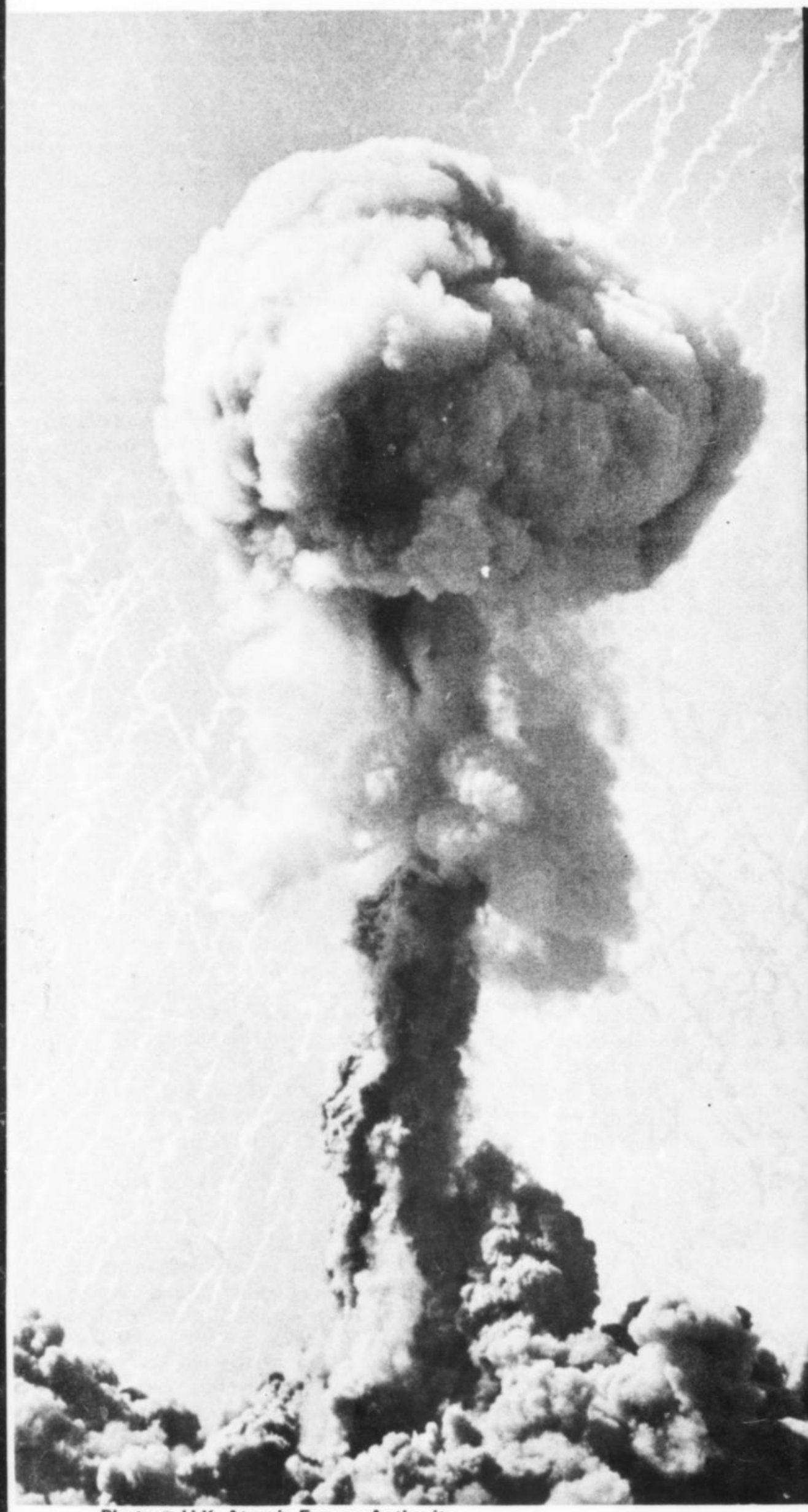
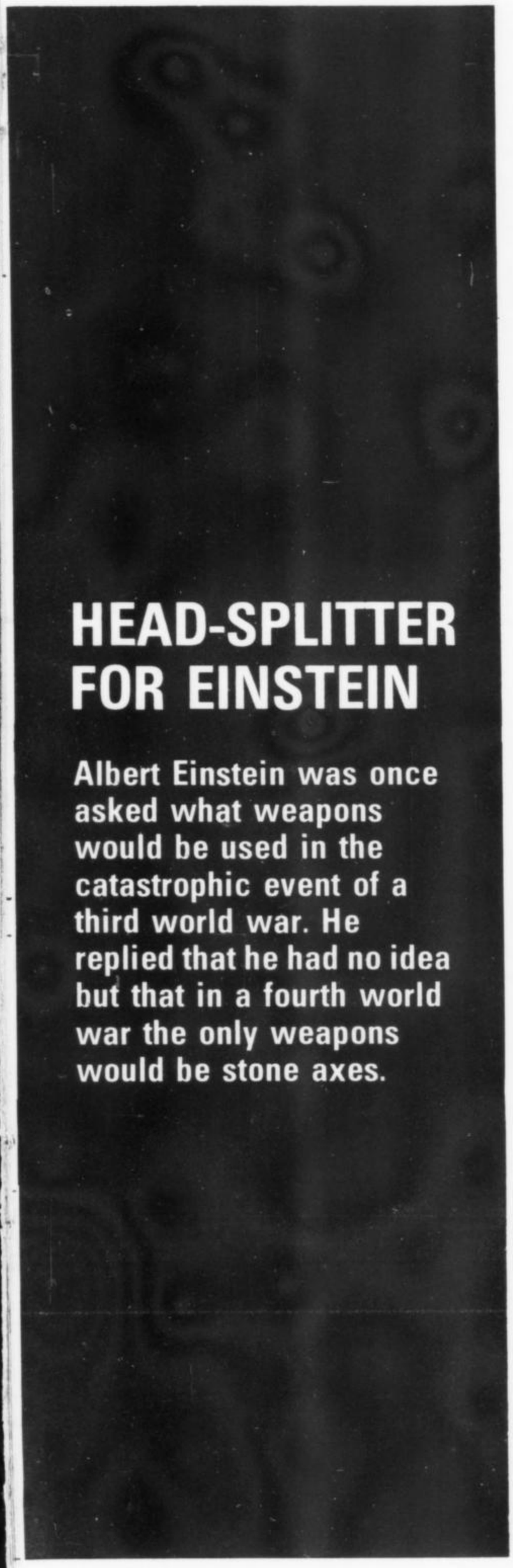


Photo © U.K. Atomic Energy Authority

Photo © Musée de l'Homme, Paris

NIGHTMARE



HEAD-SPLITTER FOR EINSTEIN

Albert Einstein was once asked what weapons would be used in the catastrophic event of a third world war. He replied that he had no idea but that in a fourth world war the only weapons would be stone axes.

by
Stockholm International Peace Research Institute

1

Under the guise of 'security', collective suicide?

SINCE World War II, the total destructive power of the weapons in the world's arsenals has increased many thousandfold. In today's world, the potential for organized violence has assumed grotesque dimensions—so grotesque as to be beyond an individual's comprehension.

The total explosive power of the tactical nuclear weapons stationed in Europe alone is equivalent to more than 30 times the TNT expended in World War II, the Korean War and the Viet-Nam War put together. Few of these weapons are less powerful than the Hiroshima bomb. If nuclear war came in Europe, the societies there would cease to exist. Even so, these weapons account for a mere fraction of the total destructive power available to the nations.

Several times in the past three decades, mankind has approached the brink of oblivion. How many more times can this happen before we go over the brink? Yet the efforts to control the mad momentum of the arms race have produced no significant results. On the contrary. Military technology advances as rapidly as human ingenuity and skills allow. Yesterday's science fiction becomes today's reality.

Nuclear deterrence, a genocidal doctrine, has become an article of faith. And mutual assured destruction, the most morally indefensible strategy ever devised, is the established policy of the big powers—an official ideology legalized by treaties. Policies designed to guarantee "security" are more likely to guarantee nuclear suicide.

We have learnt to live with nuclear weapons. We have become mentally paralyzed by the rhetoric of the arms race, in which horror weapons are given innocent sounding names—like Bambi and Hound Dog, euphemisms for nuclear missiles. We have become inured to violence—impersonal, automated violence.

Our moral judgement has been impaired by the apocalyptic calculations of scholars and strategists—how many million deaths would be

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SIPRI (Stockholm International Peace Research Institute) *is an independent institute for research into problems of peace and conflict, particularly those of disarmament and arms control. Financed by the Swedish Parliament, which founded it in 1966 to commemorate Sweden's 150 years of unbroken peace, it has an international staff, governing board and consultative scientific council. Since its foundation SIPRI has worked closely with Unesco. SIPRI publishes many studies on problems of disarmament and authoritative Yearbooks describing the situation of the world's arsenals during the year. To promote greater awareness of these issues, SIPRI, under its Director, Frank Barnaby (U.K.) is currently producing a series of booklets specially written for the general public. The articles on the following pages are based on material published in three of these booklets:* Disarmament or Destruction ?, Nuclear Disarmament or Nuclear War ? *and* Preventing Nuclear-weapon Proliferation, *as well as* SIPRI Yearbook 1975 : World Armaments and Disarmament.

VOICES FROM BEYOND THE ATOM

On these pages we present eyewitness accounts by two Japanese of the destruction of Hiroshima and Nagasaki by atom bombs in 1945. The texts are passages from a book published in the Federal Republic of Germany in 1961. Entitled *Die Stimme des Menschen* (The voice of mankind) by Hans Walter Bähr (R. Piper and Co. publishers, Munich), it is an anthology of letters from all parts of the world written between 1939 and 1945 by men and women who lost their lives as a result of the Second World War.

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LETTER FROM NAGASAKI

by Takashi Nagai
born in 1908, professor at the Nagasaki Faculty of Medicine

Nagasaki 1945

DIRECTLY after the bomb exploded, the reaction of those who could still move was either to remain where they had been at the time of the explosion or to flee immediately. Those who stayed where they were—either to help injured friends or to try to save their apartment, office or factory—were quickly hemmed in by the flames and perished along with those they had wanted to save. When the fire came closer, we took refuge on the hill near our hospital. In this way my neighbours and I escaped death by a hair's-breadth...

Getting through to the hillside was like forcing one's way through a white-hot jungle. Huge flames crackled all round us: they rose high above our heads, darting back and forth and changing direction with the wind, so that showers of sparks rained down on us. Here and there we came across medical students and nurses lying on the ground. We picked them up and carried them a little further up the hill, out of reach of the fire. All the time I was urging those around me to move faster.

I had a gash in the right temple and was losing a lot of blood. Eventually I collapsed. Professor Shirade of the surgical department tended my wound and hastily stitched it up. For a few moments I lost consciousness. When I came to, I found that I was lying in the grass beneath the billowing eddies of the atomic cloud. I was suffering terribly from my wound and had to grit my teeth to overcome the pain. Then I began to think about my wife. If she were still alive, I told myself, she would have already joined me.

Next day, looking down from the hill behind the clinic, I could see the ruins of my house. Nothing remained of Urakami but a great pile of white ashes. Nothing moved, wherever one looked, in the clear morning light...

For us the atomic bomb was something totally unexpected. I was in the radio-therapy room when the bomb exploded. At that precise moment it seemed to me that not only was the present being smashed to smithereens but that the past had been wiped out forever and the future utterly destroyed. I had seen my beloved faculty and all the students to whom I was so attached engulfed in a flash by the flames. My wife was now nothing but a little heap of charred bones which I collected one by one in the ruins of our house. Her remains weighed no heavier than a parcel you might send through the post. She had died in the kitchen.

As for me, "atomic sickness" in its most acute form now added its effects to those of the long-standing illness caused by my research into X-rays. This, along with the injury to my right side, completely disabled me. By an extraordinary piece of luck, three days earlier our two children had been sent to their grandmother in the mountains and were thus safe and sound.

The huge numbers of people suffering from "atomic sickness", the many different symptoms of this affliction, the deaths that came one after another—all this was agonizing for me just to think about, and I began to make all kinds of plans to take my mind off these things. Never before had I found my work as a scientist such a painful burden. Leaning on a stick, my body covered with wounds which hampered my movements, I began with great effort to climb mountains and cross rivers in order to visit my patients. I kept this up for two months. Then I was struck down by a violent attack of atomic sickness and had to give up my medical work altogether.

Later...

Already I have to ask people to hand me the pages of this manuscript one by one. I don't even have enough energy to examine anything through a microscope any more. Fortunately I carry the object of my research about with me in my own body.

The whole world was shocked when the first bombs were dropped on Hiroshima and Nagasaki. Indeed, I think that those who only heard about the bombing indirectly felt this shock even more violently than those of us who were directly exposed to it. People suddenly learned, without being prepared for it in any way, that it was possible to reduce a big city to dust in a matter of seconds. This prospect must have caused great consternation.

If such a weapon were used on a large scale in the future, the human race and the whole of civilization would be doomed to disappear.

Those of us who suffered the bombing had no idea at all of what an atomic bomb could be. I myself never thought for a moment that the bomb meant anything so cataclysmic, even though I was right underneath the mushroom cloud. I thought it was just a super-bomb, or something similar. It was only when the cloud began to spread out and disperse and the sunlight (which it had completely blotted out) began to filter through again until it was bright enough for me to see something, that I looked around and said to myself: "It's the end of the world".

The rest of the world cried out in horror: "The atomic bomb must never be used again".

And yet I hear that some people do not think the bomb is as terrible as all that, or that it must never be used in any circumstances: "A city is never entirely destroyed...", they say. "There are always some survivors... Radio-activity disappears in time... It's only a new weapon, more effective than any used before..."

More effective!... What do they know about it, the people who talk like this?

■ ***Takashi Nagai***

(Dr. Takashi Nagai died in 1951 from the effects of the atom bomb explosion.)

LETTER FROM HIROSHIMA

by Tamiki Hara
born in 1905 in Hiroshima

Hiroshima, August 1945

I got up about eight o'clock on that morning of August 6, 1945. The previous evening two air-raid warnings had sounded, but no bombs were dropped...

Suddenly I received a blow on the head and everything went dark in front of my eyes. I cried out and threw up my arms. In the obscurity all I could hear was a sound like the roar of a great storm. I couldn't make out what was happening. Even my own cry seemed to have come from someone else.

Then things around became visible again, though not very clearly at first, and I had the feeling I was at the scene of some great catastrophe. Behind the dense clouds of dust a single patch of blue appeared, soon followed by more and more.

Little flames began to shoot out of the building next door—a storage depot for pharmaceutical products. It was time to get away from there. Along with K., I made my way across piles of debris.

Billowing clouds of smoke were rising from the ruins of houses. We reached a place where the heat from the

CONTINUED PAGE 32

HIROSHIMA—1945 : a pencil drawing showing the horror of Hiroshima by an American artist, Standish Backus, Jr.

Drawing courtesy of U.S. Navy Combat Collection, reproduced from "WWII" (World War II) by James Jones, Grosset and Dunlap, New York, 1975

(Continued from page 17)

"acceptable" in a nuclear war, how much more megatonnage is needed for superiority, and so on. We have been misled by absurd statements about the possibility of a "limited" nuclear war, of "winning" a nuclear war, of "damage limitation", of the political "value" of overkill, and so on.

Can anything be done to move towards a saner, less barbaric world? The politicians say they have tried. If they have, then they have failed. It is now up to the public. To live in a peaceful, disarmed world is a universal desire. Can public opinion be mobilized to press reluctant politicians to pursue policies to this end before it is too late? Mankind's survival may well depend on the answer.

How much is spent on arms?

Each year the world spends an enormous amount of money on armaments—over $210 billion in 1974. This is about equal to the entire national income of the poorer half of mankind. And it is about 15-20 times the total amount of aid given to the developing countries.

Since 1900, but excluding the years of world wars, the world has spent roughly $7,500 billion on armaments at today's (1975) prices. This sum is equivalent to about $2,500 per head of the present world's population or a lifetime's income for the average Indian, for example.

Not only is the absolute amount of money spent on armaments very large, but the rate of increase of military spending is high. Even after taking into account the decreased value of money, the amount spent has doubled since 1950. But the rate of increase has not been a steady one. Throughout this century military expenditure has escalated during wars and major crises. Each such event has been followed by a period of relative stability but at a substantially higher level of expenditure.

Which countries are the big military spenders?

For many years now the United States and the Soviet Union have accounted for the vast majority of the money spent on armaments. In 1974, for example, these two powers spent 60 per cent of the total. The two major alliances, NATO and the Warsaw Treaty Organization, together spent 80 per cent in 1974.

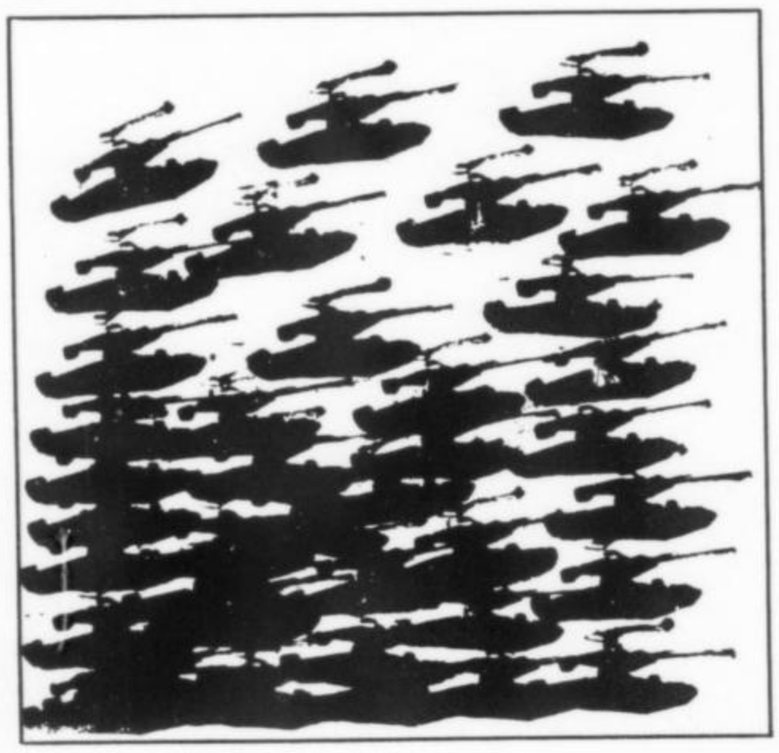
But over the past 15 years or so, the concentration of military power has shifted. This has happened because the average rate of increase has differed from country to country. In particular, the developing countries have, over about the past 20 years, increased their military spending at a higher than average rate. The most dramatic examples are, not surprisingly, the Middle East countries. In this region, military expenditure has increased on average by 20 per cent per year over the past decade—a staggering rate of increase indeed.

The rate of increase of expenditure of the four major military spenders of the post World War II era—U.S.A., U.S.S.R., U.K. and France—has been somewhat slower than that of most

In 1974, the world spent

210 BILLION DOLLARS

on arms
or
20 times
the total aid
to developing
countries

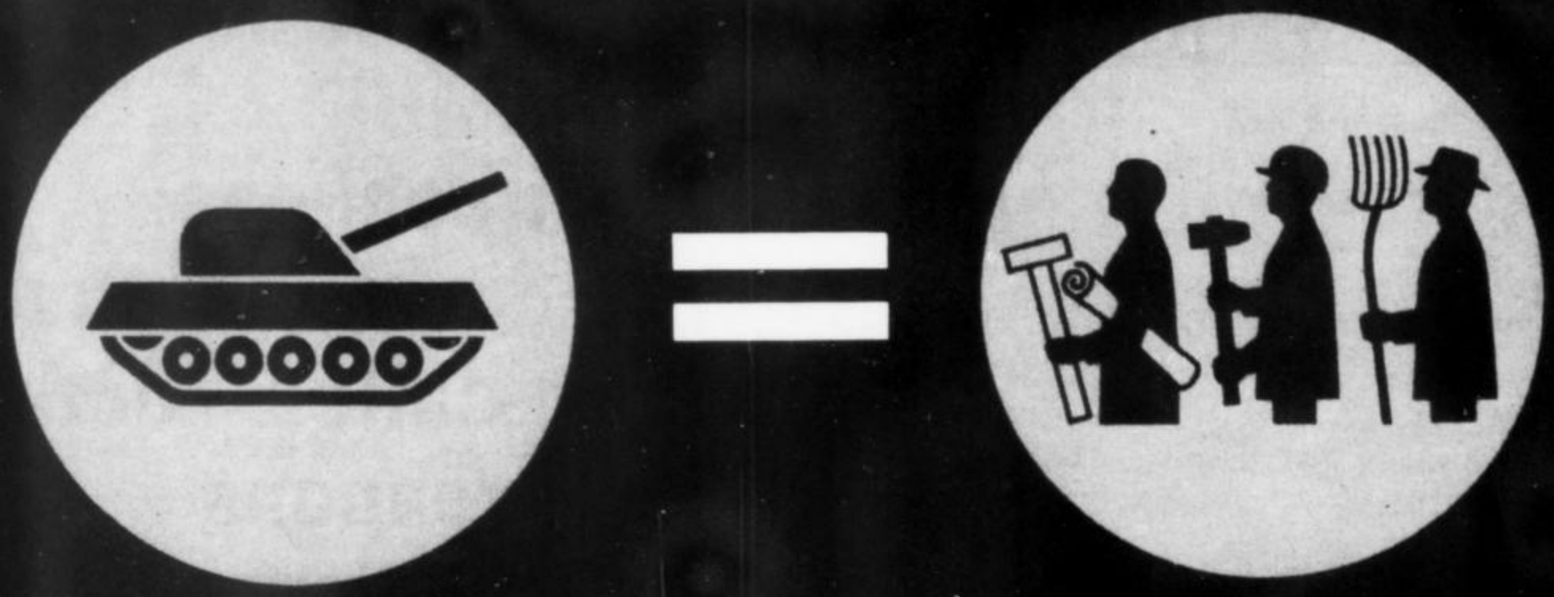


Every year the world spends

25 BILLION DOLLARS

on military research
or
4 times
world expenditure
on medical research

Unesco Courier drawings



ANNUAL ARMS EXPENDITURE OF WORLD'S INDUSTRIALIZED COUNTRIES

ANNUAL NATIONAL INCOME OF ALL DEVELOPING COUNTRIES

Drawing from *Dritte Welt* (Third World) a school textbook published by Tellus Verlag, Essen, Fed. Rep. of Germany

other countries. Thus the combined military expenditures of these countries fell from about 82 per cent of the world total in 1955 to about 70 per cent in 1974. But this does not mean that their military capability has declined. Instead, it has happened because of the rapid expansion in the level of armaments elsewhere. The entire world is becoming more and more militarized.

Where does the money go?

An analysis of the military spending of the 12 countries which together account for three-quarters of world military expenditure shows that about 30 per cent of military money is used to pay for uniformed personnel. Another 30 per cent goes to buy weapons and equipment, and a further 30 per cent to construct, operate and maintain the weapons and equipment. The remaining 10 per cent is used for military research and development.

Perhaps surprisingly, nuclear weapons and their delivery systems account for a relatively small fraction (about 10 per cent) of the total resources devoted to military uses. Even in the nuclear-weapon countries, the bulk of the money spent on weapons is used to procure conventional rather than nuclear weapons. It is an extraordinary fact of modern life that the capability to destroy totally human civilization costs just a fraction of 1 per cent of the world's annual output.

Military research and development

World expenditure on military research and development is, and has for some time been, running close to $25 billion annually—about four times the money spent worldwide on medical research—and is increasing steadily. The relative share of military expenditure absorbed by research and development has risen dramatically since the interwar years—from less than 1 per cent to the present value of about 10 per cent.

Over 400,000 scientists and engineers—roughly half of the world's total scientific and technical manpower—are now employed on improving existing weapons and developing new ones.

Thirty years ago, only five countries —U.S.A., U.S.S.R., U.K., Canada and Sweden—were major weapon producers and weapon innovators. But, by the early 1950s, some developing countries started producing arms and since then the number of them doing so has been, and still is, increasing. The establishment of a sophisticated armaments industry is a costly undertaking and the diversion of scarce resources to military production by underdeveloped economies obviously has very adverse effects on the rate of development of the civilian sector.

Table reproduced from "Disarmament or Destruction? Armaments and Disarmament" published by Stockholm International Peace Research Institute (SIPRI) 1975

DISTRIBUTION OF WORLD MILITARY EXPENDITURE

Global military expenditure	1954 ($ billion) 126.7	1974 ($ billion) 210.3
Percentage distribution	%	%
U.S.A.	49.2	31.5
U.S.S.R.	24.5	29.4
U.K.	5.3	3.2
France	3.3	2.8
Other developed countries	11.7	16.1
Third World . . .	6.0	17.0

2 50,000 Hiroshimas: such is the destructive power of the so-called 'tactical' nuclear weapons

IN 1944, no nuclear weapon existed. Today, there are tens of thousands. The nuclear arsenals of the U.S.A. and the U.S.S.R. have grown so large as to be wildly in excess of any conceivable need, military or political, of either power.

Thirty years ago, nuclear weapons could be delivered only by bombers. Nowadays, they exist in a bewildering variety of forms: intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), medium-range ballistic missiles, intermediate-range ballistic missiles, short-range ballistic missiles, depressed trajectory ballistic missiles, fractional orbital bombardment systems, free-fall tactical bombs, free-fall strategic bombs, air-to-surface missiles, air-to-surface stand-off missiles, air-to-air missiles, army artillery shells, naval artillery shells, howitzer projectiles, torpedoes, rocket torpedoes, depth charges, demolition devices, land mines, sea mines, anti-ballistic missiles and so on.

The development of nuclear-weapon systems continues unabated. Some strategic missiles are now being equipped with multiple independently-targetable re-entry vehicles (MIRVs) of very high accuracy. Soon it will be possible to deliver missile-borne thermonuclear warheads over distances of 6,000 miles and more to within a few tens of metres of the target. Almost incredible military technological advances have been made in the past three decades.

Tactical nuclear weapons

Most publicity has been given to strategic nuclear weapons, but in addition the U.S.A. and the U.S.S.R. have deployed tens of thousands of tactical nuclear weapons. In Europe alone there are about 7,000 U.S. and 3,500 Soviet tactical nuclear weapons.

The total explosive power of existing tactical nuclear weapons is enormous—so large as almost to defy imagination. The combined explosive capability of the U.S. and Soviet tactical nuclear weapons is roughly equivalent to 700 million tons of TNT or 50,000 Hiroshimas. The tactical nuclear weapons at present deployed in Europe would, if ever used, totally obliterate the continent—20,000 Hiroshimas would be unleashed.

Conventional weapons

Fear of the catastrophic consequences of nuclear war has tended to obscure the frightening developments that have been made over the past two decades in conventional (non-nuclear) weapons.

Although the nuclear bomb remains the ultimate in weapons, it has not been used since Hiroshima and Nagasaki were blasted apart in 1945. Yet, since the end of World War II, tens of millions of people have been killed or maimed for life and widespread destruction has been caused in a hundred wars in which conventional weapons were used. And environmental damage caused by some conventional weapons (in Indochina, for instance) will bear witness for years to come of the "effectiveness" of modern non-nuclear war.

Never before in human history has the military man had so much, or so varied an assortment of, weaponry at his disposal. Not only has a huge number of new weapons been developed, but even older types have been updated and "refined" to such a degree that they bear little resemblance to their predecessors.

The naval destroyer provides a good example. A destroyer built in the late 1940s displaced 3,480 tons fully loaded and was armed with six 5-inch guns, six 3-inch guns, and five torpedo tubes. For antisubmarine operations, there was only a primitive sonar and some ordinary depth charges.

Its modern counterpart displaces 6,900 tons fully loaded. The warship has an armament of only two 5-inch dual purpose guns. But these are automatically fired and operated, using radar and a remote control television system to direct fire against surface and aircraft targets. There is also a missile system for defence purposes. The antisubmarine equipment includes highly sophisticated sonar systems and antisubmarine missiles, armed with either conventional or nuclear warheads and fired from an antisubmarine helicopter.

The warships, packed with electronic equipment, are so highly automated that, despite being twice as big and infinitely more complex than the 1940-type destroyers, they carry about the same crews.

Even more dramatic changes have occurred in military aircraft. Compared with modern military aircraft, those of only 20 years ago seem to belong to another era.

A new jet fighter, for instance, carries a variety of missiles in addition to a 20-mm anti-aircraft gun capable of firing 1,000 rounds a minute. It resembles a flying computer.

A lightweight radar system has been developed for the aircraft to detect and track high-speed targets at great distances and at all altitudes down to tree-top level. This information is fed into the aircraft's central computer for the accurate launching of missiles or the firing of the gun.

For close-range combat, the radar automatically projects the target on a head-up display giving all the necessary information on a glass screen positioned at the pilot's eye level. The computer also informs the pilot if the aircraft which he has detected by eye or radar is a friend or a foe, and provides information enabling the pilot to navigate accurately literally anywhere in the world.

Remotely piloted weapons

With today's advanced military aircraft costing around $20 million each, there is a growing interest in the development of remotely piloted vehicles (RPVs) for missions such as reconnaissance, electronic warfare, ground attack and air-to-air combat. RPVs could also be used as decoys against radar-controlled air-defence

systems, which are becoming increasingly more effective and deadly.

Thanks to new technological advances, the cost of a low altitude strike-reconnaissance RPV works out at about $500,000. What is more, these pilotless warplanes, that have already proved their "usefulness" in both Viet-Nam and the Middle East, do not need the expensive ejection and survival systems nor the other man-orientated equipment necessary in a piloted aircraft.

Using equipment such as television cameras and data transmission, an RPV could be controlled precisely, and at a safe distance from the target area, by an operator either in the launcher aircraft or in a ground control centre working from television pictures transmitted from the vehicle.

One of the many new developments in conventional weapons is that of precision guided munitions, or PGMs.

There now exists a whole class of such weapons, in which are normally included all those bombs, missiles and other projectiles that can score direct hits on their targets at full range with a high probability—of say, greater than one-half.

According to the desigr of the PGM, the target may be a tank, ship, aircraft, bridge, radar installation, concentration of armour or troops, and so on. A PGM may be an air-to-air, air-to-surface, surface-to-air or surface-to-surface weapon and may be fired from an artillery piece, an aircraft, a ship, a vehicle or launched by an individual soldier.

Because PGMs can be guided during flight onto even moving targets they are considerably more accurate than unguided weapons. Various homing devices, based on TV, lasers, infrared, wire-guidance or radar homing, have been developed for these weapons.

PGMs are relatively easy to operate and they are cheap (at least compared to the cost of potential targets). Together with their accuracy, these characteristics have stimulated considerable military interest in these weapons.

Concurrent with the development of PGMs, significant advances have been made in such areas as: artificial sensors for target acquisition; night-vision equipment; information-processing systems; command and control systems: and so on. In combination, these developments are likely to make warfare increasingly automated. But very little thought has so far been given to the political, social and economic consequences of this type of warfare.

THE NUCLEAR NIGHTMARE

3 Arms control efforts have failed to produce any nuclear disarmament or even to halt the nuclear arms race

EVER since nuclear weapons were invented, attempts have been made to justify their possession —a familiar state of affairs in military technology. To this end, very elaborate theories of deterrence have been developed by strategists and other intellectuals. And dubious beliefs have evolved about the political and/or military utility of nuclear weapons—the most common one being that these weapons actually prevent war.

It is, of course, unprovable that nuclear weapons have ever prevented war but many firmly believe that they did so in the late 1940s and early 1950s. Be this as it may, it is certainly no longer true—nor has it been for a long time now—that the Soviets and the Americans are prevented from fighting each other mainly because of their possession of nuclear weapons.

All theories of nuclear strategy and deterrence based on massive assured destruction contain basic flaws. By their very nature they must. Not only are the theories often based on assumptions that defy common sense and experience—such as, political leaders will always behave rationally, countries will surrender rather than use all their nuclear weapons, adversary countries will negotiate at an early stage of a conflict, and so on—but they are inhumane, immoral, even genocidal and they seriously hamper progress towards disarmament.

Unfortunately, nuclear deterrence has become so ingrained into the thinking of politicians, strategists, military men and the general public, that it has almost become an article of faith. We have, so to speak, learnt to live with nuclear weapons.

Political leaders often subscribe to the theory of nuclear deterrence not necessarily because they believe in its virtue but for reasons of political expediency. Once new weapon systems have been developed, very strong pressures (by no means all military ones) rapidly grow within societies for their extensive deployment.

But often there is no obvious strategic justification for this deployment and so one has to be invented. And a convenient rationalization is that the deployment is necessary "to maintain and strengthen deterrence". In this way, there has been rationalization about large numbers of new types of intercontinental ballistic missiles, nuclear strategic submarines, intercontinental strategic bombers, and so on.

It is often said that if one side were weaker in nuclear weaponry it would tempt the other side to exert political pressure and blackmail on the weaker one. But this does not affect the argument for negotiated general nuclear disarmament—which would maintain an equilibrium, and therefore a feeling of security on both sides, throughout the disarmament process.

The public has become lulled into a false sense of security by those—most often undeniably sincere patriots —extolling the virtue of a balance of nuclear terror as a fine and sensible policy. But the advocates of this theory have become hoist on their own petard.

A "good" policy for one country is likely to be seen by others as "good" also for themselves. If the U.S.A. and the U.S.S.R. are seen to perceive that nuclear deterrence is a workable doctrine then other countries will probably come to believe in it too. In international politics, perceptions are more important than facts.

The dilemma for the nuclear-weapon

CONTINUED PAGE 26

THE NUCLEAR NIGHTMARE 4

A single submarine can destroy any country on earth

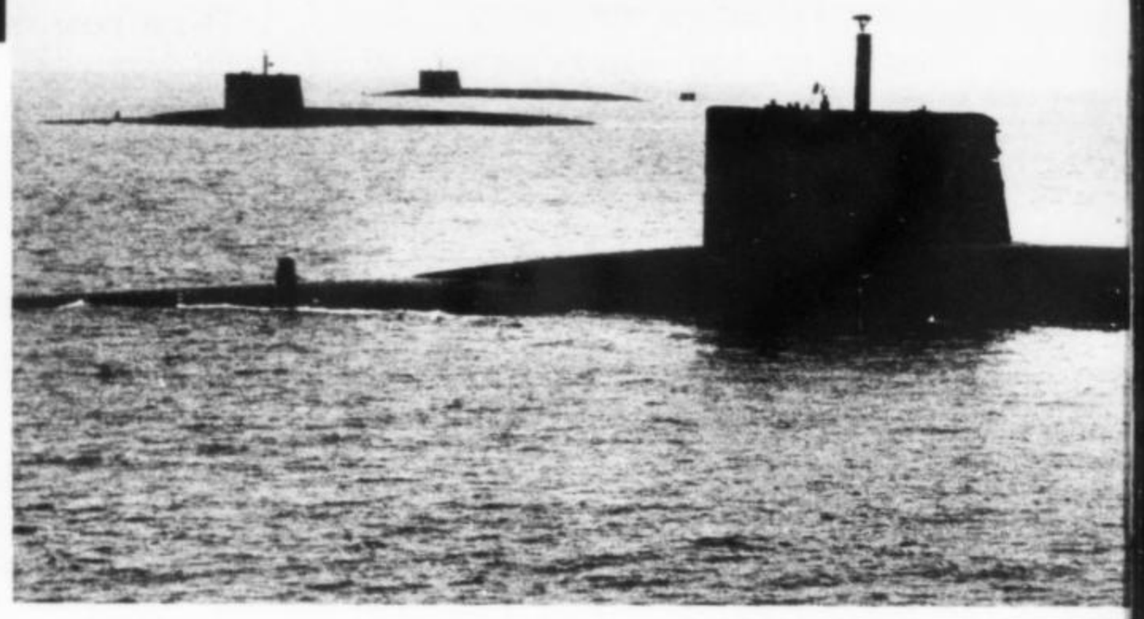


Photo USIS, Paris

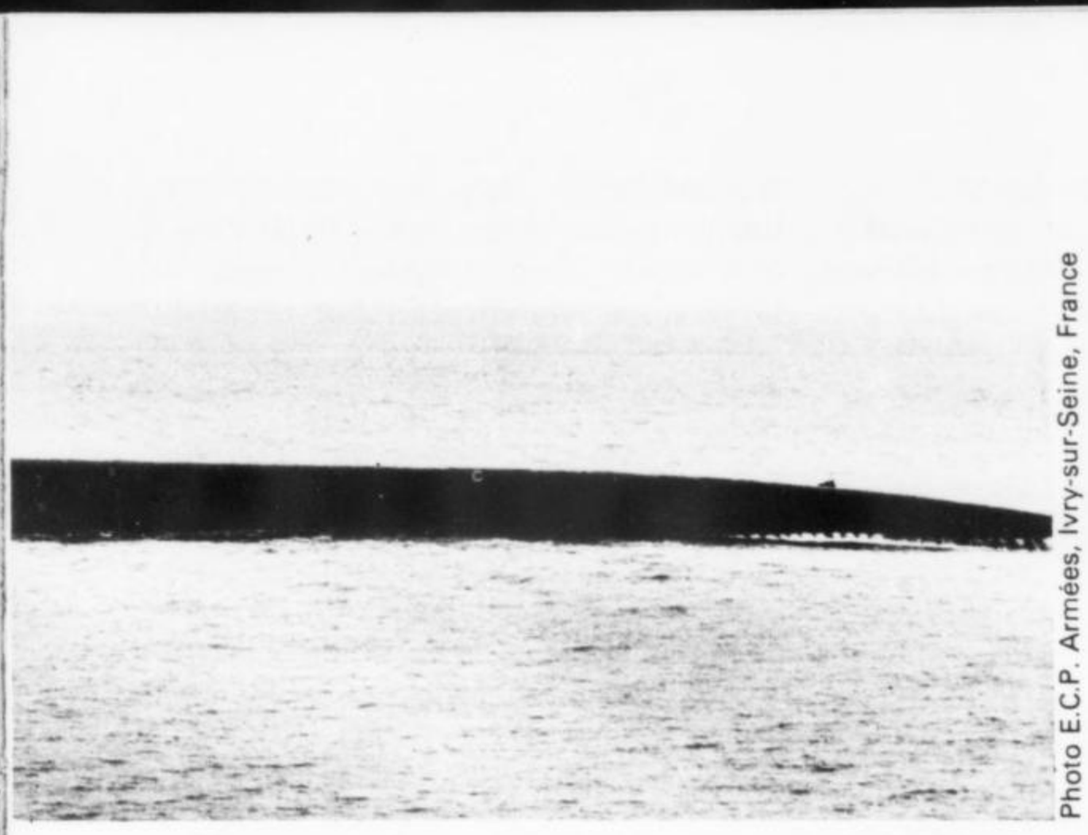
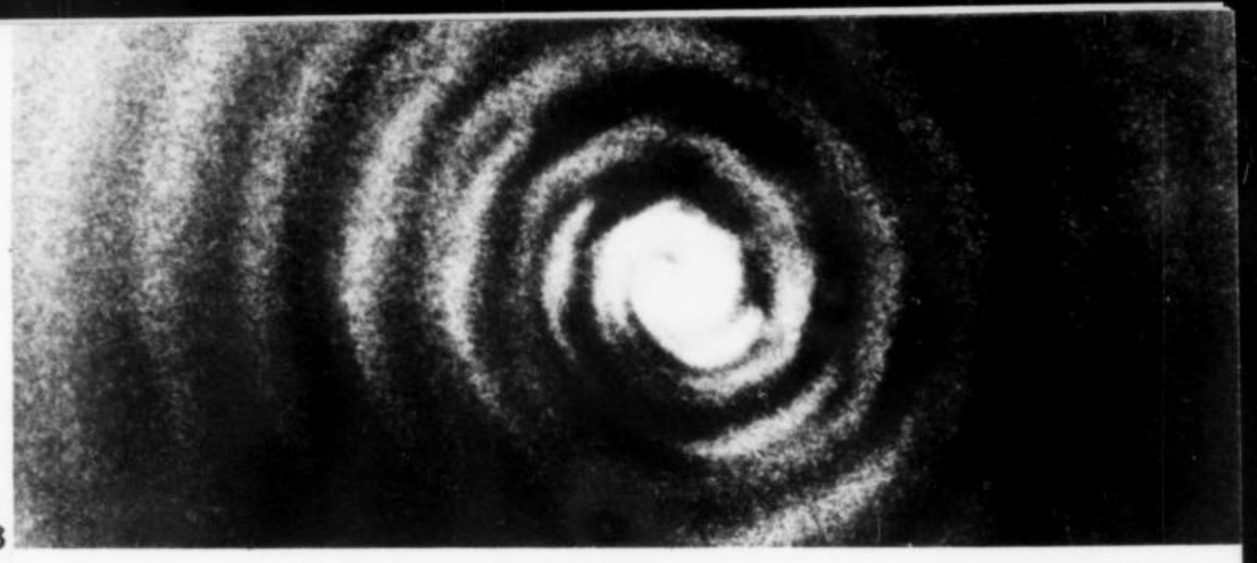


Photo E.C.P. Armées, Ivry-sur-Seine, France

Four countries today possess missile-firing nuclear submarines—U.S.A., U.S.S.R., U.K. and France. Above, three French nuclear submarines—"Redoutable", "Terrible" and "Foudroyant"—at a rendezvous on the high seas. As the so-called doctrine of "mutual deterrence" escalates, an even more powerful type of missile-firing submarine is being built. It will carry 24 multiple-warhead missiles with a range of 4,500 miles and a total of over 400 warheads. Below left, this future submarine monster, the U.S. Trident submarine to be launched in 1979. Each Trident will cost $1.8 billion, nearly double the annual budget of a country such as Morocco.

Submarines that can fire nuclear missiles have become the most deadly weapons system in today's nuclear arsenal. According to SIPRI Yearbook 1975, "World Armaments and Disarmament", nearly 100 nuclear-missile submarines were being operated in 1974 by four countries—U.S.S.R. (48 submarines) U.S.A. (41) U.K. (4) France (3). The latest type of nuclear submarine can carry 16 missiles, each equipped with 10 to 14 nuclear warheads, and has a striking power of 160 to 224 warheads, each a hydrogen bomb three times as powerful as the bomb that destroyed Hiroshima. Released independently after launching from under water (photos right) the warheads could be directed to separate targets 100 miles apart and over 1,000 miles away with an accuracy of a quarter of a mile. As one specialist puts it: "One nuclear submarine can destroy any country on earth."



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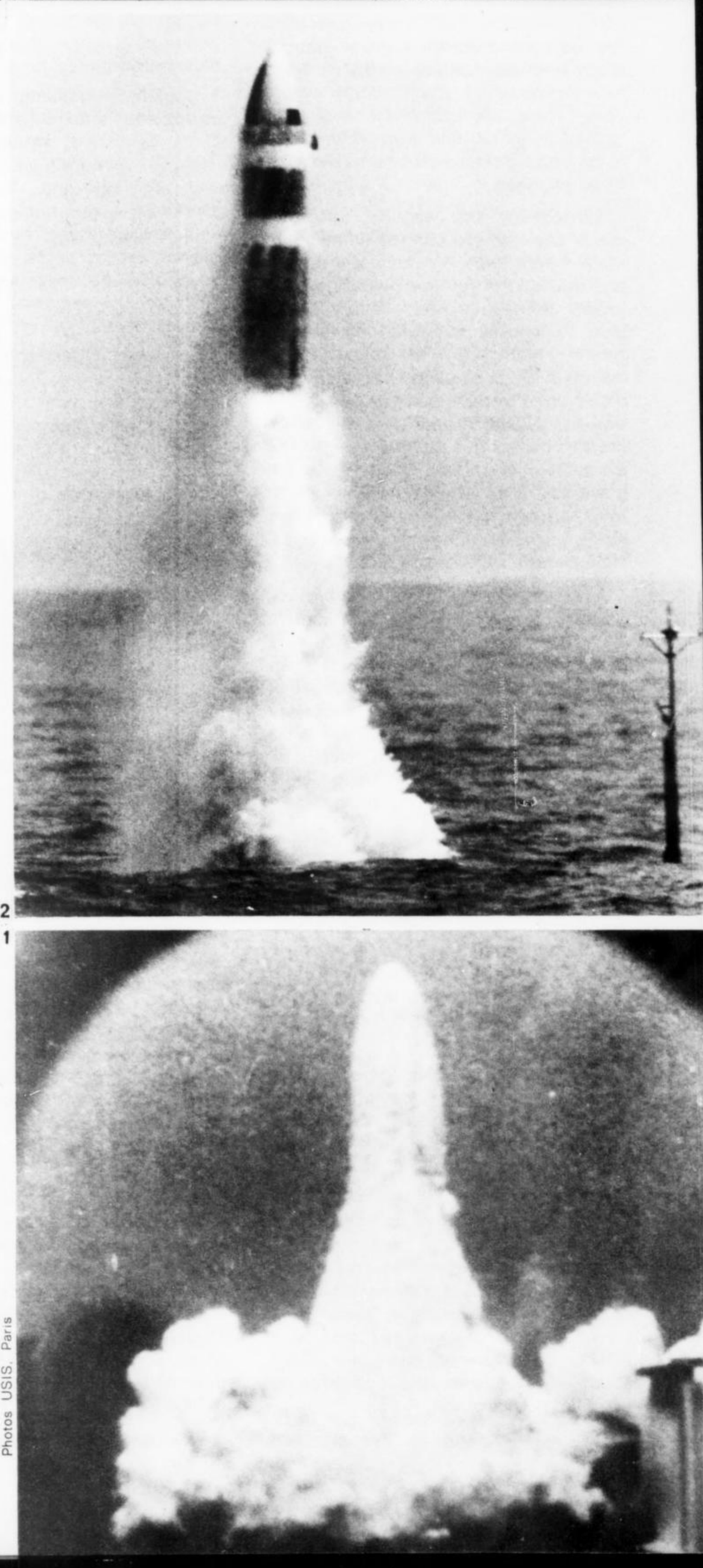

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Right, three phases in test launching of submarine-based nuclear missiles. 1. Clothed in air bubbles, a missile hurtles through the water from its launching tube. 2. Carrying a dummy multiple warhead, missile erupts from waters of ocean test-range. Nuclear submarine's extra tall antenna used for tests sticks out of water at right. (3) Vapour pinwheel pattern forms in sky as missile begins its powered flight.

Photos USIS, Paris

(Continued from page 23)

countries is how to dissuade other countries from acquiring nuclear weapons—which they are very anxious to do and rightly so—without playing down the importance they attach to their own.

The fact is, of course, that the nuclear-weapon states cannot have it both ways. But it appears that the political leaders of these countries are not prepared to declare that, in today's world, nuclear weapons have little or no political or military value. They have probably become too carried away by their own propaganda to be able to do so, even though times have changed.

Throughout this century, disarmament and the control of armaments have been more or less permanent features of the foreign policies of the great powers. And since World War II, literally hundreds of international meetings have taken place mainly in an attempt to control the nuclear arms race between the U.S.A. and the U.S.S.R. and then to reduce the number of nuclear weapons in the arsenals of the nuclear-weapon powers. But, in spite of so much talk, virtually no progress has been made towards either of these ends. How can this be explained?

A major reason for a lack of progress towards nuclear disarmament is related to the decision taken by politicians in the early 1960s to abandon attempts at the direct negotiation of general and complete disarmament and to work instead for partial arms control measures. The idea was that, by this method, it would be possible to move towards general disarmament by small steps.

Whereas "disarmament" normally means a quantitative reduction in total numbers of existing weapons by the traditional methods of international negotiation, leading to a multilateral treaty, "arms control" normally refers to negotiated measures leading to the slowing down (and eventual halting) of arms races.

In other words, disarmament refers to the elimination of armaments (either specific armaments, such as nuclear ones in the case of nuclear disarmament, or all armaments in the case of general and complete disarmament) and arms control to curbs on acquiring new weapons.

Slow progress seems to be inherent in the arms control approach. Arms control advocates claim that, in a world of security-conscious sovereign states, disarmament can only come about—if at all—as the end product of a lengthy process.

The initial stage in this process involves banning weapons of little or no military value (such as biological weapons) and banning weapons from environments of little or no military significance (such as the sea-bed, outer space, Antarctica and so on).

This process, so it is said, will establish such a degree of mutual confidence between the powers and so improve the climate of international affairs that, in due course, far-reaching disarmament may be possible.

Confidence-building measures—like arrangements to minimize the risk of "nonprovocative" weapons, the adoption of "nonprovocative" strategies, and so on—and tension-reducing measures—like nuclear-free zones, demilitarized areas, nuclear test bans, nonaggression pacts and so on—are advocated as measures which may facilitate the eventual negotiation of disarmament.

Although disarmament advocates disagree amongst themselves on the details of the most desirable general and complete disarmament plan, most agree on the urgent need for nuclear disarmament—usually as part of some broad programme of disarmament.

Arms control advocates often argue that disarmers exaggerate the dangers in a nuclear-armed world and, more importantly, they feel that it is politically unrealistic to expect significant disarmament to be achieved in a world organized as ours is today.

In their turn, disarmers argue that far-reaching disarmament is a politically realistic objective (although admittedly a difficult one to achieve) in a world of sovereign states because governments could be persuaded to disarm by, for example, the pressure of public opinion. They would then direct their energies towards disarmament instead of diverting their attention to the negotiation of partial arms control measures.

An argument often used against disarmament is that even if weapons were destroyed, knowledge of their production technology would still exist and governments could order their manufacture again at any time. This is true, but the reestablishment of an armaments industry would take time and would be extremely difficult to conceal.

The risk that weapons will be used is greatest if they are available for use at a moment's notice in the heat of a crisis. Any delay in the outbreak of war would give more peaceful methods of settling the conflict a chance of success.

The record to date is a dismal one. The only disarmament that has taken place in the past quarter century is the destruction of stockpiles of biological weapons by the U.S.A. and possibly also by the U.S.S.R. The former has been officially announced, the latter not yet.

Apart from this, not a single weapon—not even a pistol, let alone an intercontinental ballistic missile—has been destroyed as a result of an international agreement. Instead, vast numbers of weapons—conventional, nuclear and chemical—of a bewildering variety of types have been developed and deployed as fast as technological developments will allow.

Furthermore, the international trade in arms has increased alarmingly and even the most sophisticated weapons are now sold in large quantities by the advanced nations, often even before they enter the arsenal of the producing country.

Very little attention has so far been paid to the problem of controlling and reducing conventional armaments or the arms trade, even though the greatest proportion of world military expenditure is used to acquire these weapons. Yet these weapons encourage and add to the violence of local conflicts and the arms trade is one way in which the great powers, as suppliers, become embroiled in regional wars involving client states.

So far, seven multilateral treaties have been negotiated at the Conference of the Committee on Disarmament in Geneva, the main international forum for disarmament negotiations, and a number of bilateral treaties have been negotiated directly between the U.S.A. and the U.S.S.R.

The first multilateral arms control treaty was the Antarctic Treaty (1959) which prohibits the militarization of the Antarctic—the area is to be used exclusively for peaceful purposes. The veteran disarmament advocate, Philip Noel-Baker, commented that "while disarming Antarctica, we put 7,000 nuclear weapons in Europe. We should have disarmed Europe and put those weapons in Antarctica." But the Antarctic Treaty was only the first of a series of arms control measures which merely banned weapons from environments in which there is no military interest.

Another treaty of this type is the Outer Space Treaty (1967) which controls military activity in space and

prohibits the placing in orbit round the earth of any objects carrying weapons of mass destruction. And then there is the Sea-Bed Treaty (1971) which rules out the sea-bed for the emplacement of nuclear weapons or any other weapons of mass destruction.

The intention of the Treaty of Tlatelolco (1967), to make Latin America a nuclear-free zone, is a good one. Unfortunately, the two countries in the region most likely to acquire nuclear weapons, Brazil and Argentina, have not fully acceded to the Treaty and are unlikely to do so. In their absence, the Treaty is a dead letter.

Many apologists for the arms control approach regard the Partial Test Ban Treaty (1963) as a singular success. But it has mainly functioned as an antipollution measure and, as such, it can be regarded as the first modern international treaty to control the contamination of our environment.

No one today doubts that our environment would now be considerably more contaminated with radioactive material if the U.S.A., the U.S.S.R. and the U.K. had continued testing nuclear weapons in the atmosphere and underwater.

Although France and China have not stopped conducting nuclear tests in the atmosphere (1) they have done so much less frequently than did the other three powers. The Treaty may also have prevented India—who has ratified it—from detonating its nuclear explosive device above ground.

After the Treaty, the U.S.S.R. and the U.S.A. continued testing nuclear weapons underground at about the same rate as they had tested nuclear weapons before 1963. The Partial Test Ban has not, therefore, significantly slowed down the nuclear arms race between the U.S.A. and the U.S.S.R.

If it has had any effect at all, it was to limit the further development of very large thermonuclear weapons—but military interest in these weapons waned some time ago. On the other hand, very substantial progress has been made since 1963 by underground testing in improving the yield-to-weight ratio of nuclear warheads and thus developing, for example, very small nuclear weapons; hardening weapons against anti-ballistic missiles (ABMs); developing multiple independently-targetable re-entry vehicles (MIRV) and ABM warheads; and so on.

It is, therefore, difficult to claim convincingly that the Partial Test Ban was a significant step towards nuclear disarmament. Nothing short of a comprehensive test ban, prohibiting all nuclear tests, could reasonably be so described.

There is little doubt that public concern over the radioactive contamination of man's environment was the main factor which induced the U.K., the U.S.A. and the U.S.S.R. to agree to discontinue tests in the atmosphere, in outer space and underwater.

Public opinion had been aroused by a series of dramatic nuclear events prior to 1963, such as the severe radioactive contamination of a boatload of Japanese fishermen by an American thermonuclear explosion in 1954 in the Pacific (see "Unesco Courier", Aug.-Sept. 1967) and the Soviet atmospheric explosion at Novaya Zemlya in October 1961 of the largest nuclear device ever exploded in the world—a thermonuclear weapon with an explosive power equivalent to that of 58 million tons of TNT.

The fact that the force of public opinion overcame the strong objections to a partial test ban on the part of those groups within the nuclear-weapon powers with vested interests in nuclear-weapon testing is an object lesson.

It demonstrates that if successfully mobilized again, public opinion could compel reluctant politicians to move towards nuclear disarmament. This may be the best—if not the only—hope of achieving such disarmament.

The other two existing arms control measures are the Non-Proliferation Treaty (1968), and the Biological Weapon Convention (1972) which prohibits the production of biological weapons and stipulates the destruction of biological-weapon stockpiles.

The Non-Proliferation Treaty is undoubtedly a fragile instrument. The Treaty is weak because two nuclear-weapon powers (China and France), and many key states with the technical ability and the nuclear material to acquire nuclear weapons (Argentina, Brazil, India, Israel, Pakistan and South Africa among them) have not associated themselves with the Treaty.

But the most serious weakness is the imbalance between the obligations of, and the benefits for, the nuclear-weapon parties (the U.S.A., the U.S.S.R. and the U.K.) and those of, and for, the non-nuclear-weapon parties. The latter states have substantial obligations but have, so far, received very few benefits.

Moreover, the nuclear-weapon parties have failed to fulfill the few obligations under the Treaty which they do have. In particular, the obligation to take "effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament" has clearly not been fulfilled. If the nuclear-weapon parties do not take their obligations seriously, why, say the others, should we?

The most obvious next candidates for multilateral arms control treaties are a chemical-weapon convention and a comprehensive nuclear test ban. Verification is said to be the main stumbling block in the negotiation of both of these measures but experience shows that once the political will to obtain an agreement exists, verification problems are easily dealt with. Such was the experience with the Biological Convention and the Strategic Arms Limitation agreements between the U.S.A. and the U.S.S.R.

The real reason for the delay in prohibiting chemical weapons is that they are of much greater military interest than biological weapons. Meanwhile, binary chemical weapons are being developed. These weapons contain chemicals which, although harmless singly, produce poisonous compounds when mixed. Mixing occurs either when the munition is fired or when it impacts.

The deployment of binary weapons will make the negotiation of a comprehensive ban on chemical weapons considerably more complicated. And a ban not including binaries would be ineffective. This is a typical example of the way in which technological advances can complicate, as time elapses, the negotiation of arms control and disarmament treaties.

In July 1974, the U.S.A. and the U.S.S.R. signed a Treaty on the Limitation of Underground Nuclear Tests, banning the underground testing of nuclear weapons having a yield exceeding that of the explosion of 150,000 tons of TNT (150 kilotons).

But this cannot be regarded as a substitute for a complete ban on ▶

(1) In June 1974, France announced that her nuclear tests in the atmosphere in the summer of 1974 would be the last of their kind, and that future tests would be carried out underground.

nuclear-weapon tests. The very high threshold of 150 kilotons is not, in practice, a significant limitation because most American and Soviet tests during the past few years have been less than about 200 kilotons. The Treaty will, therefore, hardly affect the current development of nuclear warheads.

The most serious objection to the Treaty is that it may indefinitely delay a comprehensive nuclear test ban—a measure most urgently needed to bring the nuclear arms race under some control.

The Treaty has, no doubt, a few positive aspects. It will complicate the development of new high-yield warheads by both sides. It will also make it difficult for them to carry out stockpile-sampling, because the existing large thermonuclear weapons could not be tested at their full yield. Cessation of explosions in the megaton range may have favourable environmental effects. It will reduce risks of radioactive venting, artificial earthquakes or tidal waves.

Most important, however, are the verification provisions. It will be the first time that detailed information concerning sites and yield of nuclear weapon explosions will be exchanged between the parties. Apart from the political significance of this procedure constituting a step towards greater openness among states, a suitable verification framework could be created for use in a possible comprehensive test ban.

The provisions of the Treaty do not extend to underground nuclear explosions carried out by the parties for peaceful purposes (Article III). This means that the threshold of 150 kilotons does not apply to such explosions. But it is not possible to distinguish with certainty nuclear tests serving peaceful aims from those serving military aims.

A mere statement by the testing state that its intention is "peaceful" may not be found satisfactory; the loophole could be taken advantage of for a new large weapon development, if at some point in the future this became necessary.

On the other hand, if the yield limit of 150 kilotons were imposed on all underground nuclear explosions, certain peaceful applications of nuclear energy, such as large-scale excavation projects, would have to be abandoned.

The studies on the possible use of nuclear explosions to dig a sea-level Panama Canal indicated that some 300 nuclear blasts with yields ranging up to 15 megatons would be required. It has also been estimated that the construction by nuclear excavation of the northern 65 km part of the Pechora-Kama-Volga canal in the U.S.S.R. would require about 250 nuclear explosives with yields of up to 600 kilotons each, while the yield for any one "salvo" of charges might attain three megatons.

The most familiar bilateral agreements between the U.S.A. and the U.S.S.R. are those that have arisen out of the Strategic Arms Limitation Talks (SALT) between the two powers—these began in 1969 and have been going on ever since. The first SALT agreement (SALT I), which came into force in October 1972, included an Anti-Ballistic Missile Treaty and an Interim Agreement on offensive weapons.

A major weakness of SALT I is a total lack of any restriction on the improvement of the quality—accuracy, penetrativeness and range—of ballistic missiles and their launchers. The technological arms race is encouraged and even legitimized—better weapons can be substituted for those which become obsolete.

Most significant is the lack of control of the number of nuclear warheads each missile can carry. Since SALT I, the number of nuclear warheads deployed by the U.S.A. and the U.S.S.R. has increased, and is increasing, considerably.

On 24 November 1974, at their meeting in Vladivostok, President Gerald Ford and General Secretary Leonid Brezhnev agreed that the SALT negotiators would, from January 1975, work for a new agreement (SALT II) under which each side would be limited to 2,400 stategic nuclear delivery systems—a net increase on the present total number deployed. Within this number each side would be further limited to a total of 1,320 ICBMs and SLBMs equipped with MIRVs.

★

The arms control efforts—multilateral and bilateral—over the past 15 years have failed to produce any nuclear disarmament or even to halt the nuclear arms race. In spite of this, the public has been seriously misled into believing that steady progress is being made in disarmament.

The main reason for this mistaken belief is that political leaders habitually make euphoric statements about the value of arms control treaties. Each treaty is signed with much pomp and ceremony, and to the accompaniment of speeches full of high-sounding promises of bigger and better things to come. And the preambles and articles of the treaties usually contain far-reaching commitments to further progress—rarely, if ever, followed up.

The political leaders, are, of course, aware of the almost universal human desire for a secure and peaceful disarmed world and of the considerable political benefit to be gained from paying lip-service to this desire. But perhaps not surprisingly they, and those involved in negotiating arms control treaties, take on a "professional optimism" which apparently causes them to convince themselves that substantial progress is being made. That may be a psychological necessity for those involved but it also hampers progress towards disarmament. ■

In the last 30 years six countries (the United States, the U.S.S.R., the United Kingdom, France, China and India) have developed nuclear weapons, and at least 20 others have, through peaceful nuclear programmes, acquired the technical knowledge and nuclear material to produce such weapons. Below, the explosion of China's first atomic bomb in October 1964.

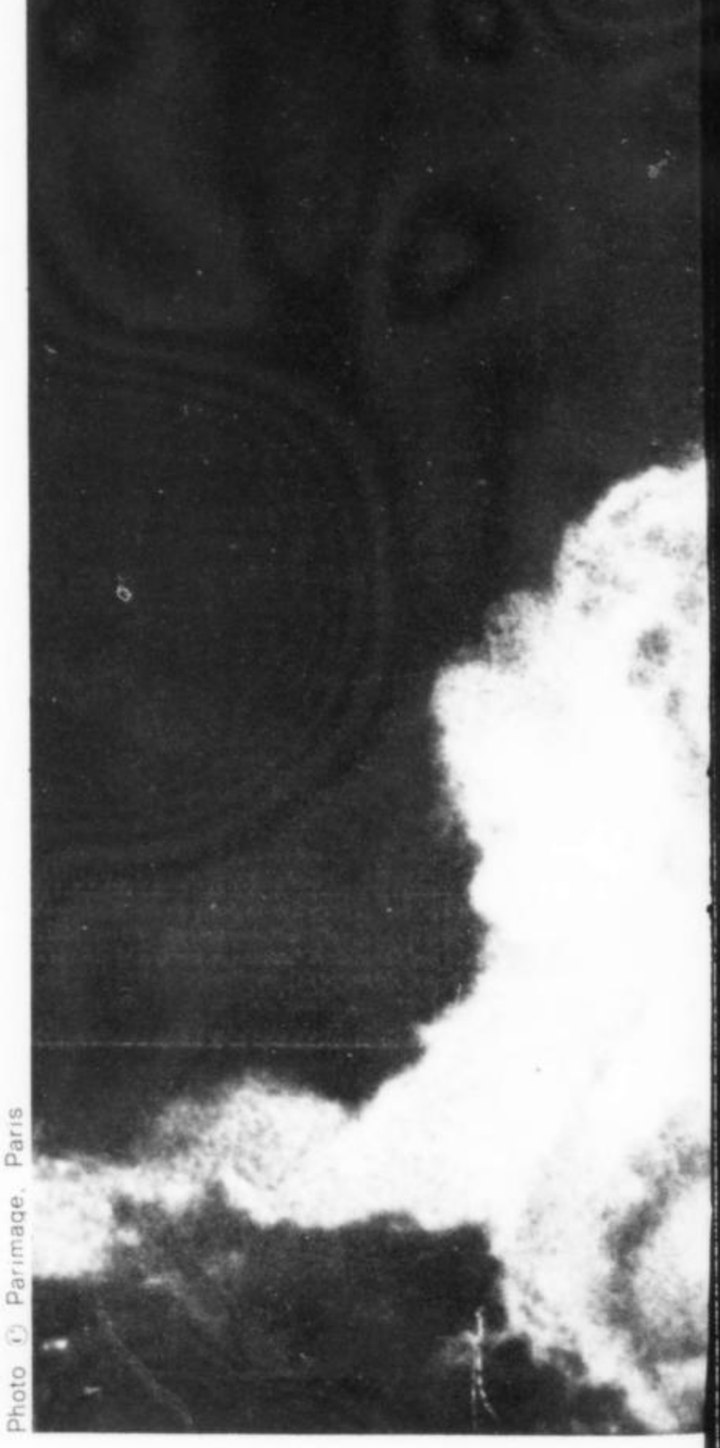


Photo © Parimage, Paris

THE NUCLEAR NIGHTMARE

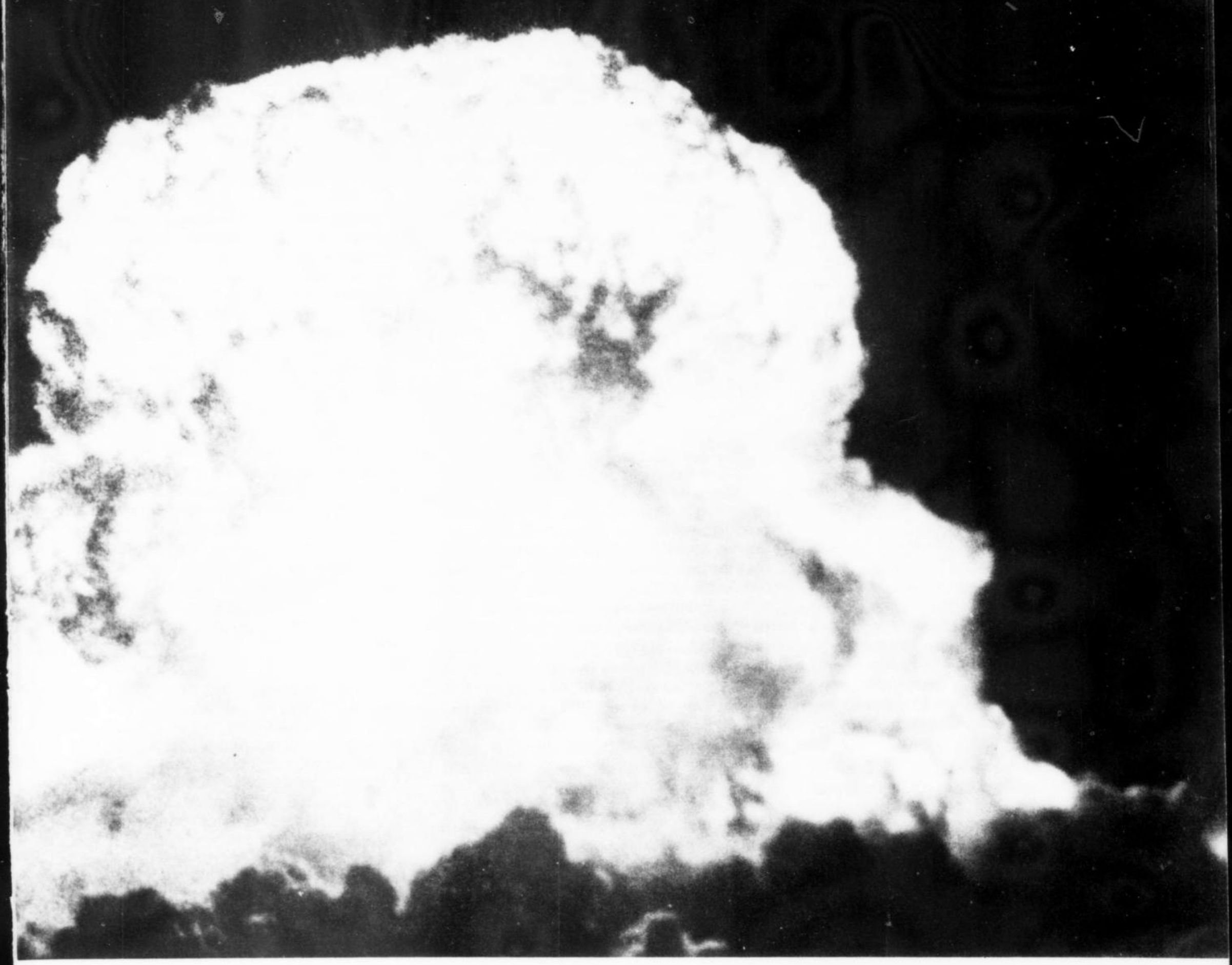
5 A tragic paradox: peaceful atoms which foster the proliferation of nuclear weapons

UNTIL a few years ago, most countries were prevented from readily acquiring nuclear weapons by two main barriers—one technical and the other economic. A lack of knowledge of the technical details of nuclear-weapon design and a lack of expertise and experience in nuclear technology in general were virtually insurmountable obstacles to many countries, even if they had had the political desire to produce nuclear weapons.

Apart from the lack of technical know-how, few countries, other than the present nuclear-weapon countries, could have afforded a nuclear force without diverting unacceptably large resources from other activities.

But in country after country these barriers have become, and are becoming, ineffective. This radical change has come about because of the spread of nuclear technology for peaceful purposes.

Although nuclear energy has manifold applications in industry, medicine, agriculture and so on, the main reason for the spread of peaceful nuclear technology is related to the rapidly increasing world demands for energy. The demand for electricity, the most versatile form of energy, is increasing faster than that for other forms of energy. In many—if not most—situations around the world, the electricity produced by nuclear-



power reactors is significantly cheaper than that generated by coal- or oil-fired power stations.

This is rather dramatically illustrated by the fact that Iran is buying nuclear-power reactors even though it has enormous reserves of oil. The rationale for this is that it is more economical for Iran to use nuclear power to generate electricity and to sell or conserve its oil, rather than burn it in power stations. There are, of course, other reasons why countries want nuclear-power reactors—to acquire the option to produce nuclear weapons, for example—but the economic factor is, in general, the dominant one.

Few people have a clear impression of how extensively nuclear technology has already spread around the world or how rapidly it is likely to continue to do so.

The nuclear-weapon countries were the first to build peaceful nuclear-power reactors—the U.S.A. and the U.S.S.R. in 1954, and France and the U.K. in 1956. The peaceful nuclear programmes in these countries evolved directly from their military programmes. It is of relevance to the present-day situation to note that just the opposite applied to the Indian nuclear explosion in 1974. This was entirely a by-product of India's peaceful nuclear programme and a relatively inexpensive one at that.

The Fed. Rep. of Germany was the first country to embark on a purely peaceful nuclear-power programme.

Its first nuclear-power reactor went into operation in 1960. Canada and Italy were next, with nuclear-power reactors operating in 1962. Sweden and Japan followed in 1963; the German Democratic Republic and Switzerland in 1966 ; the Netherlands and Spain in 1968; Belgium and India in 1969; Pakistan in 1971; Czechoslovakia in 1972; and Argentina and Bulgaria in 1974. China has built one or two nuclear-power reactors (in the late 1950s or early 1960s) but to supply electrical power for its uranium-enrichment plant, as part of its nuclear-weapon programme.

At the end of 1974, therefore, 20 countries had already installed nuclear-power reactors. An additional six countries—Austria, Brazil, Finland, South Korea, Taiwan and Yugoslavia—have their first nuclear-power reactors under construction. And many others, amongst them Australia, Denmark, Egypt, Hungary, Iran, Israel, Mexico, the Philippines, Poland, Romania, South Africa and Thailand, have announced plans to acquire power reactors.

By 1980, if present plans are followed through, some 30 countries will have nuclear-power reactors with a total electrical generating capacity about 15 times that of the world's reactors in 1970. Looking further ahead, it is predicted that the 1980 figure for nuclear generating capacity will increase more than tenfold by the year 2000.

From now on nuclear power will move increasingly into the developing regions—slowly at first, but much more rapidly in a couple of decades hence. Argentina, Brazil, India, Pakistan, South Korea and Taiwan are the vanguard of this trend.

Cheap energy supplies are vital for industrialization. In fact, supplying a source of cheap energy may well be the main (if not the only) significant contribution that technology can make to development. For this reason, the spread of peaceful nuclear power to developing regions probably could not (and should not?) be hindered.

In countries with advanced nuclear-power programmes—Canada, France, the Fed. Rep. of Germany, Japan, U.K., U.S.A. and U.S.S.R.—large nuclear industries have been established. Investments in these industries already amount to billions of dollars and are rapidly increasing. As might be expected, the nuclear industry is becoming highly competitive and cut-throat, similar to other multi-billion dollar concerns, such as oil, aviation, electronics and so on.

The nuclear industry can be divided into two sections—one designing and installing power reactors and the other providing fuel for them. Nuclear reactors normally use uranium, a widely distributed element, as fuel. Natural uranium contains two main types of atom, the isotopes uranium 235 and uranium 238.

In ordinary uranium, atoms of uranium 235 occur in the proportion of only one atom to 140; the other 139 are atoms of uranium 238. But uranium 238 undergoes nuclear fission—the process that produces the heat in a reactor which is used to produce steam to drive a turbine which generates the electricity—much less readily than uranium 235.

Consequently, many reactors use not natural uranium as fuel but uranium in which the proportion of uranium 235 has been increased above the natural value. The process of increasing the content of uranium 235 is called enrichment and is, as we shall see, of importance to the problem of nuclear-weapon proliferation.

As uranium "burns" in a nuclear reactor, plutonium—an element not found in nature—is produced as an inevitable by-product. One isotope of plutonium, plutonium 239, readily undergoes fission, as does uranium 235, and therein lies the importance of plutonium.

Uranium fuel is normally put into a reactor in the form of cylindrical metal-clad elements. As the uranium is used up, plutonium accumulates in the fuel elements.

After a time, a given fuel element stops contributing effectively to the total production of fission energy in the reactor and is then removed and replaced with a new one. The spent element is then sent to a chemical plant, called a reprocessing plant, where plutonium is recovered. This is done because plutonium is a very valuable material (more so than gold), required as fuel for future nuclear-power reactors—specifically, breeder reactors.

But plutonium can also be used for the production of nuclear weapons. And this is the crucial link between the spread of peaceful nuclear technology and the proliferation of nuclear weapons. It is true that the plutonium has to be separated from the reactor fuel elements but there are enough reprocessing plants in the world to ensure that no country should have much difficulty in obtaining access to one.

Nuclear-power reactors produce relatively large amounts of plutonium. A typical power reactor (having a generating capacity of about 500 megawatts of electricity) produces about 120 kilograms of plutonium annually. This would, in theory, be sufficient to produce about 12 nuclear weapons per year with yields similar to that of the bomb dropped on Nagasaki (equivalent to about 20,000 tons of TNT).

When nuclear-power reactors are operated for the production of the cheapest electricity, the plutonium they produce is not suitable for the construction of the most efficient nuclear weapons because it consists of a mixture of isotopes. Plutonium 239 is the preferred material for nuclear weapons.

To obtain relatively pure plutonium 239, the reactor fuel elements have to be removed from the reactor after a period of a few weeks rather than the normal period of 2 to 3 years.

Nevertheless, the plutonium normally produced in nuclear-power reactors would still be usable for effective—albeit not optimally efficient—nuclear weapons.

In 1975, the world's nuclear reactors will produce 25,000 kilograms of plutonium. And in 1980, they will probably produce nearly 100,000 kilograms. By 1980, the world will probably have accumulated about 350,000 kilograms. About one-third of this plutonium will be produced in countries which do not now have nuclear weapons—theoretically, enough for them to have made 12,000 nuclear weapons!

Breeder reactors differ from ordinary reactors in that, by converting uranium into plutonium, they produce more fuel than they consume. About every 10 years double the amount of fuel initially put in accumulates.

Thus, enough fuel becomes available, not only to keep the reactor operating, but to fuel a new one of the same size. Because breeder reactors will eventually become relatively self-sufficient insofar as fuel is concerned, they are an attractive proposition since there is likely to be a scarcity of uranium at economic prices.

Breeder reactors are being developed mainly in France, the Fed. Rep. of Germany, Japan, U.K., U.S.A. and U.S.S.R., and they may become available commercially by the mid-1980s. It is predicted that their use will eventually become so widespread that, in the 21st century, they will be the main source of electricity unless or until they are superseded by a cheaper and more abundant source of power—presumably solar or fusion energy.

Although the first generation of breeder reactors will probably use uranium, the preferred fuel for subsequent generations will be plutonium. This will have important consequences for nuclear-weapon proliferation because any country owning a breeder reactor will have on its territory a large amount of plutonium suitable for immediate use in efficient nuclear weapons.

In summary, any country with a nuclear-power reactor has on its territory continuously increasing amounts of plutonium suitable for the construction of effective nuclear weapons and the capacity to produce plutonium of the type needed for the most efficient nuclear weapons—an alarming state of affairs.

Plutonium can also be produced in research reactors. These are relatively small reactors often used by countries planning to embark on a nuclear-power programme to train personnel in reactor technology and to give them experience in reactor operations.

Israel is an example of a country which has accumulated a stockpile of plutonium from a research reactor. About 50 countries now operate research reactors and so the picture is more alarming than it appears at first sight.

This dangerous situation will, in 20 or 30 years from now, become even more critical when breeder reactors are widely used. Unless effective steps are taken to prevent it, we can look forward to a steadily increasing number of nuclear-weapon powers. It is unrealistic to expect otherwise.

Because the technical and economic barriers to the acquisition of nuclear weapons are no longer effective—at least for any country with a peaceful nuclear programme—a political barrier is necessary if an attempt is to be made to control the proliferation of nuclear weapons. For many countries, this political barrier is the Non-Proliferation Treaty (NPT). Of crucial importance to this Treaty is the question of nuclear safeguards.

Any country with plutonium on its territory will want to assure itself that it can account at all times for almost all of the material. Not only does plutonium have a very high monetary value but it is a very toxic material (a particle of microscopic dimensions inhaled into the lung can cause lung cancer).

Moreover, plutonium is frequently transported by road, rail and sea—between nuclear reactors and reprocessing plants, and between reprocessing plants and plutonium stores. Thus, at a very early stage in its nuclear programme, a country will establish a national control system—or safeguards system—based on modern accounting methods and sophisticated instrumentation. These national systems are being constantly modernized and improved as the amounts of plutonium to be safeguarded sharply increase.

National systems do not, of course, assure other countries that plutonium is not being diverted to military purposes. For this reason, international nuclear safeguards are far more reassuring for other countries than any national ones. But even with the best safeguards technology available, the undetected diversion of sufficient plutonium for "one-bomb-a-week" production will soon become possible.

For many years now much nuclear material and nuclear equipment for peaceful uses has been exported. Exported nuclear material includes enriched uranium, mainly used as fuel for nuclear reactors. So far, only the nuclear-weapon countries have had the facilities required to produce enriched uranium on a large scale.

A uranium enrichment plant is an enormous industrial undertaking, very costly to construct, and only seven large plants now exist—three in the U.S.A. and one each in China, France, the U.K. and the U.S.S.R. At present, the U.S.A. and the U.S.S.R. are by far the main producers of enriched uranium, each with a virtual monopoly position in its own part of the world.

But other countries, including the Netherlands (in co-operation with the Fed. Rep. of Germany and the U.K.), Australia, India, Japan and South Africa, are building, or plan to build, large-scale enrichment plants.

The uncontrolled dissemination of uranium-enrichment technology seriously increases the risk and the dimensions of nuclear-weapon proliferation since an enrichment plant gives a country the capability not only to produce nuclear-reactor fuel but also the capability to produce the highly-enriched uranium needed to trigger a thermonuclear weapon.

For reasons which have not been made public, uranium 235 is the preferred (if not the essential) material for efficient triggers for thermonuclear weapons—it seems that plutonium is much inferior for this.

Exporting countries normally require that the nuclear material and equipment supplied, and any plutonium produced from this material and equipment, are subjected to safeguards against diversion to military use.

Bilateral safeguards treaties between exporting and importing countries have been used for this purpose, but it is now more usual for exporting countries to rely on the International Atomic Energy Agency (IAEA) to provide safeguards on exported nuclear facilities. In fact, one of the main tasks of the Agency, which was set up in 1957, has been to administer nuclear safeguards and it has, over the years, accumulated a great deal of expertise.

The Non-Proliferation Treaty has added a new and desirable dimension to international safeguards. Each non-nuclear-weapon party to the treaty has undertaken to accept IAEA safeguards not only on imported nuclear facilities, but on all peaceful nuclear activities within its territory. ■

LETTER FROM HIROSHIMA *(Continued from page 19)*

flames was unbearable, and then we found another street which took us to the Sakai bridge. The crowds of refugees making for this spot were getting bigger all the time. I began to walk towards the Izumi palace. Bushes trampled underfoot by those in flight had formed a kind of causeway. Nearly every tree had been decapitated.

At first everyone had thought that only his or her house had been hit. It was only when one came outside that one saw that everything had been destroyed. And yet, although every building had been demolished, there was no sign of the craters usually made by bombs. On the other bank of the river, fires which had seemed to be dying down sprang up again more fiercely than ever.

Suddenly in the sky above the river I saw a mass of air of extraordinary transparency sweeping upstream. I hardly had time to shout "a tornado", when a terrifying wind was upon us. Bushes and trees began to shake madly; some were uprooted and tossed into the air from where they shot down like arrows on to the grim chaos below. It was as though the image of some fearful inferno was being projected over the earth.

A moment after the whirlwind had swept past, a kind of twilight overshadowed the sky. Just then I met my elder brother. His face looked as if it were covered with a thin film of grey paint. The back of his shirt was in shreds, revealing a huge wound that resembled a sunburn.

As we went in search of a boat along the narrow quay beside the river I saw many people who were completely disfigured. They were everywhere along the river, their shadows silhouetted against the water. Their faces were so terribly puffed up that it was difficult to distinguish men from women. Their eyes were mere slits and their lips were monstrously swollen. They were nearly all dying and their injured bodies were stripped of clothes. As we passed close to them some called out to us in weak, barely audible tones: "Give me a little water", or "Please come and help me".

An agonizing cry pulled me up short. The naked body of a young man was lying in the river and a few feet away, crouched on a step, were two women. Their heads seemed to have swollen in size by half again and their features were pitifully deformed. It was only by their long hair, half burned away, that I recognized them as women.

At last we found a little boat and rowed across to the other side. It was almost dark by the time we reached the bank. Many people seemed to have been injured on this side of the river, too. A soldier squatting by the waterside asked me to give him a little hot water and then, leaning on my shoulder, he walked painfully across the sand. "We'd be better off dead", he said abruptly. I silently agreed and at that moment, without exchanging a single word, I knew we both felt the same ungovernable rage at the senselessness of what lay around us.

A man with an enormously swollen head ravaged with burns sat at a table drinking hot water from a tea cup. His face might almost have been made out of black soya seeds. His hair had been cut off in a straight line on a level with his ears. Later, when I had seen more burn victims with their hair like this, I realized that below the brims of their hats it had all been scorched away.

As darkness fell, the scene became even more hellish. Everywhere people were calling for water.

Suddenly there was an air-raid warning: somewhere a siren must have escaped damage. Its screaming rent the night air. Downstream the flickering glow of the flames showed where the city was burning.

In the temple district, many badly injured people were lying everywhere on the ground. There was not even a tree or a tent to give them shade. We built ourselves a roof by propping some flimsy boards against a wall and

THE UNITED NATIONS AT AGE 30

(Continued from page 15)

developed a range of political and operational methods.

Among these, we note the important role which the quiet diplomacy of the successive Secretaries-General has played in promoting the peaceful settlement of disputes among states. The United Nations has also succeeded in imposing some restrictions in the field of nuclear and other sophisticated weaponry and in slowing down the unlimited armaments race. Still, it is a fact to be regretted that sums in excess of $200 billion are spent every year on armaments (see article page 17).

Certainly more remains to be done, but in the political field one cannot reasonably accuse the United Nations of inertia or of not responding with all means at its disposal to situations constituting threats to international peace. Apart from that, we are more and more aware today that a lasting peace in this world can be built only if conditions of social and economic stability and justice prevail.

International peace is impossible without social peace. In this respect the United Nations has an ever increasing role to play, its endeavours being supported by the specialized agencies which are part of the growing United Nations family.

The United Nations has already gone a long way towards addressing the new phenomena affecting mankind in the present period. Reflecting the conscience of mankind, it perseveres in the search for a just order and more balanced economic relations in the world of today. It has never ceased to foster universal respect for human rights and to condemn discrimination of every kind.

The fundamental issue with which the United Nations, and for that matter any international organization, is confronted, remains that of the willingness of its members to implement its collective decisions. This fundamental issue will determine in the long run the success or failure of the United Nations or of any other international organization composed of states. Ultimately, it is all members which share the blame for the weaknesses or failures of the United Nations; it is all members which can claim credit for its strengths and successes.

Former Secretary-General U Thant, when addressing the commemorative session of the General Assembly held on the occasion of the 25th anniversary of the United Nations, declared:

"There are two alternatives before this Organization: one is that there will be no moral force in this world, there will be no declaration of intent to abide by the Charter nor profession

then crawled underneath. Six of us were crammed into this tiny space for 24 hours. Two metres away stood a cherry-tree on which a few leaves still survived. Under this tree two school-girls had collapsed. Their faces were scorched and blackened and their skinny backs were exposed to the sun. They begged for a little water. They had come to Hiroshima the previous day to help with the harvest and had thus become two more victims of this terrible calamity.

The sun was now setting...

Even before sunrise we heard all around us the sound of prayers; here people seemed to be dying one after the other. The two schoolgirls died just as the sun came up.

Towards noon there was another air-raid warning. A droning sound could be heard in the sky. All the time people were dying and nobody came to remove the corpses. Helpless and bewildered, the living wandered among the dead.

By now we could see the devastated main streets. An empty grey expanse stretched out beneath a leaden sky. Only streets, bridges and the branches of the river were still recognizable. In the middle of it all were hideously mutilated and swollen bodies. Here hell had become a reality.

Everything human had been obliterated. The faces of the dead all looked alike, as if wearing an identical mask. Pain made the limbs of the dying jerk in spasms, in curiously rhythmic movements, before they finally stiffened in death. Kilometres of cable and countless fragments of the poles which had carried them were strewn about, twisted and tangled. Looking at a tram which had been upended and burned out in a flash, or a grotesquely swollen dead horse, gave one the impression of being in the middle of a surrealist painting.

We crossed a ruined wasteland which seemed endless. The belt of shattered houses stretched far out into the suburbs. It was only when we had passed through Kusatsu that we came to green, unravaged countryside. The sight of dragonflies in graceful, darting flight over the green rice-fields moved us profoundly. Then we took the long and monotonous road to the village of Yawata, which we reached that night. In the morning we again had to face our wretched existence. Not only were the wounded getting no better, but the uninjured were growing weaker each day, wasting away from lack of food.

Some days later I saw a schoolboy arrive. It was my nephew who was later to die of his injuries. He was at school at the moment the bomb exploded, and when the blinding flash lit up his classroom he hurled himself under his desk. The ceiling collapsed and buried him but he managed to get out through a hole, with a few school-mates. Most of the children died instantly. My nephew fled to Mount Hiji with his friends. While climbing the mountain he kept on vomiting a white liquid. A week after his arrival in the village his hair began to fall out and after two days he was completely bald. Already the rumour had spread that no injured person could survive if he lost his hair and his nose bled. And yet my nephew was still to survive for quite some time, despite his serious condition...

Towards evening, I crossed the bridge and set off across country in the direction of the earthwork which stands on the bank of the Yawata. A black dragonfly was drying its wings on a rock. I bathed there, gulping in great lungfuls of air. Turning my head I could see the foot of the mountain wrapped in twilight, while the distant summits still glinted in the setting sun. It might have been a landscape out of a dream. Above me the sky was absolutely silent. I felt as though I had only come into the world after the explosion of the atom bomb.

■ ***Tamiki Hara***

(A victim of atomic radiation in 1945, Tamiki Hara committed suicide in 1951)

of faith and commitment to its principles and purposes . . . The other alternative is for the Organization to receive stronger and heartier support from all its Member States, especially from the mightier ones . . . and for its Member Governments to act and behave in such a way as to make steady progress towards a just, peaceful and prosperous human community so that this planet may be a safe place to live in."

And Secretary-General Waldheim, at a ceremony celebrating the 30th anniversary of the signing of the United Nations Charter, had this to say:

"We have a clear choice before us —between searching for genuine international co-operation to meet our common problems, or returning to the narrow nationalism which has brought so much tragedy and misery to mankind in this century.

"Today, let us resolve that we shall take the road of international co-operation. If we do, I am confident that we shall overcome our difficulties and that this Organization will grow in strength and authority. For I am convinced that the United Nations is still the world's best hope for peace."

This year, on the occasion of the Organization's 30th anniversary, one can expect that there will be many laudatory statements paying tribute to the United Nations. However, it is not words but actions that count, and what is necessary is the political will of states to support the United Nations and work together through the world organization in order to solve the common problems of mankind.

The question is whether the community of nation states has sufficient courage and determination to make the United Nations more effective. Much remains to be done in the world of today, much can be achieved through international co-operation by using the United Nations as an instrument, and indeed certain issues can only be solved with the help of the Organization. Perhaps the stringent demands of an interdependent world will convince nation states to proceed with renewed vigour and confidence along the path which they opened at the end of the Second World War when they created the United Nations organization.

■ ***Kurt Herndl***

UNESCO NEWSROOM

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■ **Screen Education: Teaching a Critical Approach to Cinema and Television,** by A. W. Hodgkinson. (Reports and Papers on Mass Communications, No. 42) 5th impression, 1975, 98 pp. (10 F).

■ **Lifelong Education and School Curriculum,** by R. H. Dave. (Unesco Institute for Education Monographs, No. 1) 3rd impression, 1975, 90 pp. (6 F).

■ **Planning the Development of Universities — IV,** edited by Victor G. Onushkin. (Unesco - International Institute for Educational Planning (IIEP), 4th in a series of reports based on an IIEP research project) 1975, 139 pp. (55 F).

■ **Teacher's Study Guide on the Biology of Human Populations : Africa.** (A version specially prepared for Africa. Asian and Latin American versions in preparation), 1975, 454 pp. (48 F).

■ **The International Decade of Ocean Exploration (IDOE) 1971-1980.** A global, comprehensive programme for oceanographic research to promote a rational use of the oceans. (Intergovernmental Oceanographic Commission technical series, No. 13) 1975, 87 pp. (15 F).

■ **Annual Summary of Information on Natural Disasters. No. 8, 1973.** Detailed information on earthquakes, tsunamis (seismic disturbances of the ocean) volcanic eruptions, landslides and avalanches. 1975, 101 pp. (18 F).

■ **Planning National Infrastructures for Documentation, Libraries and Archives,** by J. H. d'Olier and B. Delmas (Documentation, libraries and archives : studies and research series, No. 4) 1975, 328 pp. (38 F).

■ **World Guide to Technical Information and Documentation Services.** (Documentation, libraries and archives : bibliographies and reference works series, No. 2) 2nd edition, revised and enlarged, 1975, (60 F).

■ **New Trends in Integrated Science Teaching, Volume III: Education of Teachers,** edited by P. E. Richmond. 1974. 227 pp. (30 F).

New education for artists

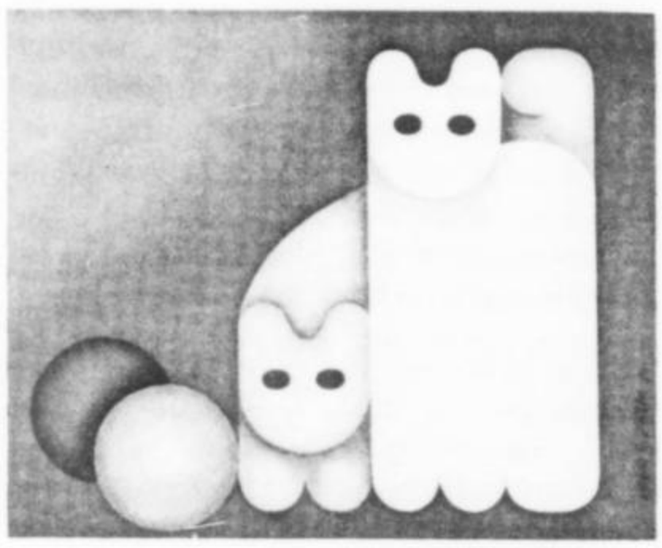
A special issue of "Art", published by the Unesco-affiliated International Association of Art, summarizes studies of experimental and advanced programmes for the education of painters, sculptors, craftsmen and designers in 11 countries. Sixteen institutions are described in this issue, which is based on an international Unesco study carried out in 1973-74. "Art" is available (price 10 F) from the International Association of Art, Unesco House, 1, rue Miollis, 75015 Paris.

Unesco and the Helsinki Conference on European Co-operation

Considerable expansion of co-operation among European countries in all spheres of Unesco's competence is provided for in the Final Act of the Conference on Security and Co-operation in Europe, signed by 35 countries in Helsinki, on 1 August 1975. In requesting the Finnish Government to transmit a copy of the Final Act to Unesco's Director-General, Amadou Mahtar M'Bow, the Helsinki Conference marked the importance it accords to Unesco's contribution to European co-operation in the fields of culture, education, science, information and environmental protection. On receiving a copy of the Final Act from Mr. Ralph Enckell, the Finnish Ambassador to France and Permanent Delegate to Unesco, the Director-General said that Unesco is ready not only to pursue its current regional activities in Europe but also to undertake new ones so as to reflect a consensus of the countries which participated in the Helsinki Conference. He recalled the work already being done by the European Centre for Higher Education in Bucharest (Romania) set up by Unesco and the role of the Scientific Co-operation Bureau for Europe at Unesco's H.Q. in Paris. In the Final Act, the Conference declared itself unanimously convinced of the need "to exert efforts to make détente both a continuing and an increasingly viable process, universal in scope".

UNICEF greeting cards

This year's UNICEF greeting cards, sold to provide food, medical care and schooling for needy children in over 100 countries, are now available at UNICEF sales points throughout the world. A UNICEF desk calendar for 1976 with 54 illustrations is on sale as well as the cards, which offer more than two dozen designs. This UNICEF "Mini Card", one of a series of five designs, reproduces the delightful "Cats", by Brazilian artist Cesar Villela.



International literacy awards for 1975

Two Unesco-sponsored international prizes for outstanding work in literacy teaching were awarded to educators from Brazil and Somalia at a special International Literacy Day ceremony, on September 8, 1975 in Persepolis (Iran). The 1975 Mohammed Reza Pahlavi Prize, donated by the Shahinshah of Iran, went to the Brazilian philosopher and educator Paulo Freire, for developing a method of adult literacy teaching. The Nadezhda K. Krupskaya Prize, from the U.S.S.R. Government, was awarded to Mr. Abdirizak Mahamoud Abukar, for devising a written national language in Somalia used in large-scale literacy campaigns. For the Mohammed Reza Pahlavi Prize, honourable mentions went to the organizers of literacy programmes in Afghanistan, the Arab Republic of Egypt, Panama and Zambia, and, for the Krupskaya Prize, to literacy teaching organizations in the People's Republic of the Congo, India, Iraq and Togo.

Unesco medal for Philae

Unesco has issued a medal to commemorate the dismantling, transfer and reconstruction of the temples of Philae in Egypt, final stage of the international campaign launched by Unesco in 1960 to save the monuments of Nubia, threatened by the waters from the Aswan High Dam (see "Unesco Courier", Nov. 1974). Above, obverse side of the medal depicting the head of Isis, the Egyptian goddess to whom Philae's most important temple is consecrated, and reverse side with frames bearing the name of King Ptolemy II (Philadelphus) one of the temple's builders, shown protected by Nekhbet, the vulture goddess of Upper Egypt. Other Unesco medals already issued feature Moenjodaro (Pakistan), Venice (Italy) and Michelangelo. Proceeds from the sale of the Philae medal will go to the international fund to save the Nubian monuments. Available in gold (455 French francs), silver (133 F) and bronze (60 F), the medal can be obtained from the Philatelic Service, Unesco, Place de Fontenoy, 75700 Paris, France.

Flashes...

■ *Unesco's Gift Coupon Programme donated $250,000 worth of books, educational, scientific and cultural materials during 1974 to projects in 30 Member States.*

■ *The urban proportion of Asia's population (20 % today) is likely to double by the year 2000, according to "Population in Asia : A Source Book", recently published by Unesco's Regional Office for Education in Asia.*

■ *To draw attention to the problems of the blind, Brazil has issued a stamp that can be read in braille.*

■ *More than 300 million people in developing countries are jobless or underemployed, reports ILO.*

■ *Some 1,000 primary, secondary and teacher training schools in 63 countries now take part in Unesco's Associated Schools Project for education to promote international understanding and peace.*

Imp. GEORGES LANG, PARIS. — Dépôt légal C 1 — Octobre 1975 — IMPRIMÉ EN FRANCE (Printed in France)

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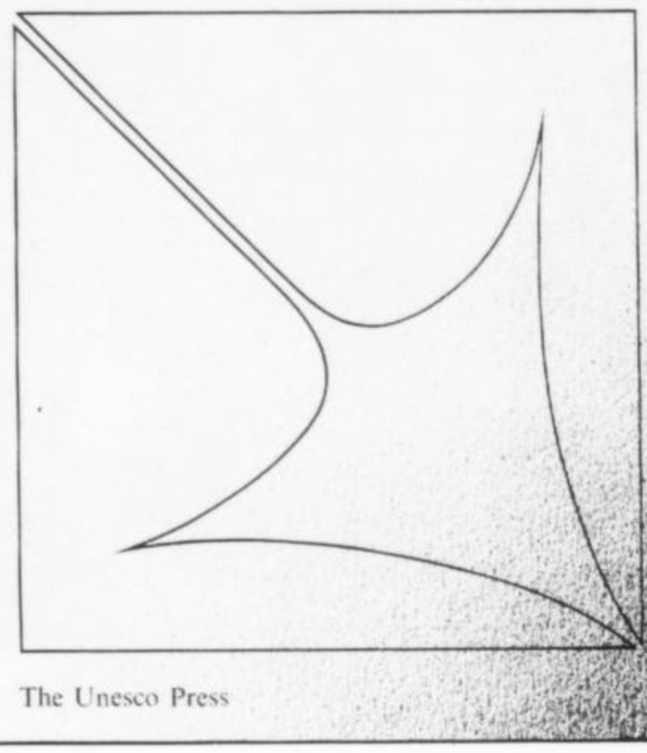

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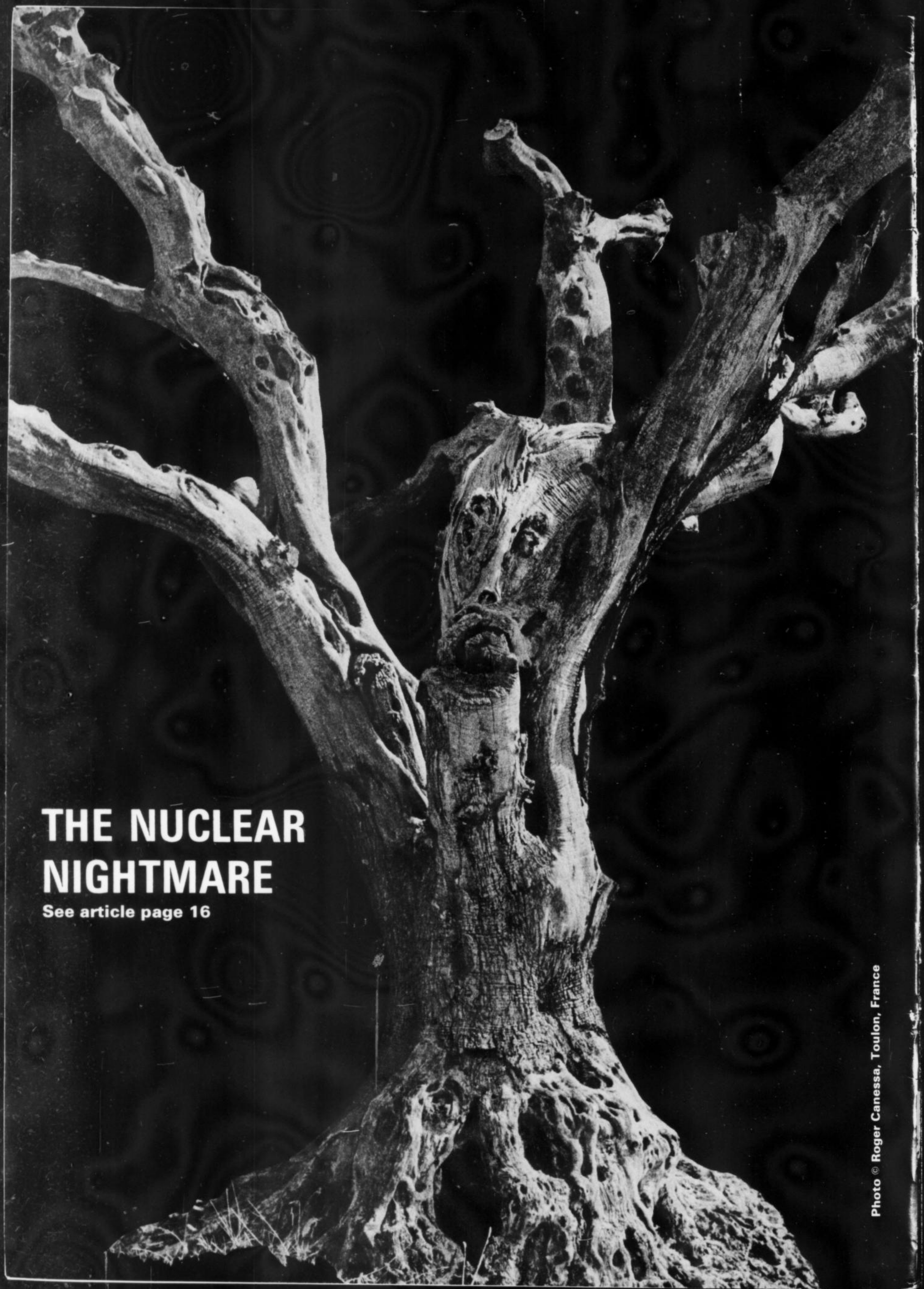

THE NUCLEAR NIGHTMARE

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